ORGANIC AGRICULTURE IN OKLAHOMA:

CATALYSTS AND ROADBLOCKS

FOR PRODUCERS

By

SHELLEY ELIZABETH MITCHELL

Bachelors of Science in Animal Science
Oklahoma State University
Stillwater, Oklahoma
1997

Bachelors of Science in Biological Science
Oklahoma State University
Stillwater, Oklahoma
1995

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Thesis Approved:

Dr. Lowell Caneday
Thesis Adviser

Dr. Sarah L. Kimball

Dr. Donald P. French

Dr. A. Gordon Emslie
Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Since World War II, conventional agriculture has become extremely efficient and productive, due largely to chemicals, monoculture crops and livestock, and new developments in biotechnology such as genetic engineering (Comer, Ekanem, Muhammad, Singh, & Tegegne, 1999; Goering, Norberg-Hodge, & Page, 1993; Lotter, 2003; Schlosser, 2002; Vagnetti & DeWitt, 2002). Since the early 1970s, the production of food per person has outpaced the production of people by 16 percent (Kimbrell, 2002, p.7)! But how long can this pace be maintained? Many of the inputs that keep the large conventional farms running, such as fuel and fertilizer, come from places away from the farm, and are made from petroleum, which is nonrenewable. Is conventional agriculture therefore sustainable—can it keep producing *over time?*

Americans appear to enjoy inexpensive food costs; however, large corporations run increasing numbers of conventional farms. Corporate farms are run as businesses with profit thought of first and foremost. Communities with large corporate farms lose jobs, have their environments degraded, and lose local sales revenue (Horne & McDermott, 2001). Food travels thousands of miles from corporate farms to the consumers on federally subsidized highways. The small family farms are disappearing because they cannot compete economically with today's corporate farms (Cheeke, 2004; Halweil, 2004; Schlosser, 2002; Vagnetti & DeWitt, 2002). The cheap food America

enjoys is not so cheap when *all* costs—cultural and environmental costs included—are considered.

While it is important to increase food production due to growth in world population, there is an increasing environmental awareness among today's consumers (Francis, C., Lieblein, G., Gliessman, S., Breland, T.A., Creamer, N., Harwood, R., Salomonsson, L., Helenius, J., Rickerl, D., Salvador, R., Wiedenhoeft, M., Simmons, S., Allen, P., Altieri, M., Flora, C., & Poincelot, R., 2003). In addition, there has been an increase in health, safety, and animal welfare concerns regarding food production. Because of this awareness and concern, consumers are increasing demand for organic (one type of sustainable agriculture) products.

In the late 1990s, surveys showed that one third of Americans bought organic products occasionally, and ten percent purchased large amounts of organic products on a regular basis; by 2000, the United States' organic market was worth $6 billion (Lotter, 2003, p.65). Oklahoma's Organic Products Act is in compliance with the National Organic Program through the United States Department of Agriculture. Consumers buying certified organic food are assured that only allowed substances have been on cropland during the last three years (at least), any livestock had regular access to the outdoors, and numerous other stringent regulations have been met (National Organic Program, 2002).

In spite of consumer demand, there are negative and wary attitudes toward sustainable agriculture among government and higher education officials, even conventional farmers; in a 1990s 'knowledge and attitude survey' regarding nine agriculture terms, "organic farming" ranked eighth, just ahead of "government

regulation" (Lotter, 2003, p.81). Most of the wary attitudes of conventional family farmers toward sustainable agriculture are due to worries about decreased yields and profits when switching to sustainable methods (Lotter, 2003). Frequently, there is also pressure by the community to have 'clean' farms—sustainable techniques that allow some weeds and mixed crops are not viewed as clean (Wechsler, 2002).

In addition to negative attitudes, there are other barriers to the widespread practice of sustainable techniques. It is often not economically feasible for family farms to switch production methods, and since the average age of farmers has increased to the mid-50s, with 61% of farmers aged 55 and older in 1997 (up from 37% in 1954) (Hoppe, 2002, ¶ 1), it is not reasonable to expect older farmers to change their entire method of operation in the later years of their careers (Vagnetti & DeWitt, 2002). And even though fertilizers, pesticides, fuel, and other off-farm inputs may be expensive, the United States' agricultural policies (such as subsidies) make conventional farming the logical choice for maximizing profits and government payments (Faeth, Repetto, Kroll, Dai, & Helmers, 1991; Ray, Ugarte, & Tiller, 2003).

In addition, agricultural research at universities focuses mainly on conventional agriculture: in the year 2000, land grant universities grew organic crops on only 0.07% of their research area (Lotter, 2003, p.81), by early 2003, the 1,162 acres dedicated to organic research still only represented 0.13% of the land grant universities' research acreage, and less than half (492, or less than 42.6 %) of those acres were certified organic (Sooby, 2003). The early 2003 report, State of the States: Organic Farming Systems Research at Land Grant Institutions, 2001-2003 (Sooby, 2003), reports no organic research at either Oklahoma State University or Langston University (Oklahoma's two

land grant institutions). Later in 2003, Oklahoma State University's Wes Watkins Agricultural Research and Extension Center in Lane, Oklahoma, began several organic studies on its 273-acre site (Oklahoma State University, 2006) and was certified organic in December 2005 (Oklahoma Department of Agriculture, Food, and Forestry, 2006).

This lack of research, together with sometimes uncooperative or unknowledgeable extension educators, becomes a barrier for farmers wishing to implement sustainable or organic agriculture techniques. Other barriers include general ignorance of sustainable or organic practices, as well as pressure from loan managers, fellow farmers, and salespeople to farm conventionally (Lotter, 2003).

Statement of the problem

Oklahoma farmers and ranchers have recently come under public scrutiny for issues such as eutrophication of streams, rivers, and lakes due to runoff from fields where chicken litter is spread (Allen, 2005; Edmondson, 2005; Sutherly, 2002); water pollution, aquifer depletion and odors from swine production (Hatfield, 1998; Stephens, 1998); and water pollution and aquifer depletion from crop production (Guru & Horne, n.d.; Mashburn & Sughru, 2004). This negative public attention accentuates the need for farmers to use more sustainable techniques in order to increase positive public relations while making the most efficient use of resources.

But what are "sustainable techniques"? There is no universally accepted standard definition. Sustainable agriculture encompasses a vast array of Good Agricultural Practices, "the application of available knowledge to the utilization of the natural resource base in a sustainable way for the production of safe, healthy food and non-food agricultural products, in a humane manner, while achieving economic viability and social

stability (Food and Agriculture Organization of the United Nations, 2002, p.3)"—soil and water conservation, chemical-free weed and pest management, preservation of biodiversity, habitat and wildlife conservation, even diversification to manage risk. It is safe to say that most farmers are practicing at least some of these techniques if they have been in the business for more than a few years, or else their land would have eroded, their soil would be depleted of nutrients and unable to support crops, their pastures would be barren, etc.

Nonetheless, while the volume of published material on sustainable agriculture is starting to increase, the amount of material regarding Oklahoma's sustainable agriculture is scant (a recent AGRICOLA database search found 4,362 entries on sustainable agriculture, only 34 of which mentioned Oklahoma). And while a Census of Agriculture is required by law every 5 years, providing a plethora of information regarding multiple aspects of farms around the country, information about individual farms and their practices is disaggregated for confidentiality purposes. Because of this, it is difficult to see trends in Oklahoma farming practices—is Oklahoma farming becoming more conventional (large-scale, one or two crop farms with heavy chemical use) or more sustainable (multiple crop farms managed with minimal chemical inputs)? What motivates Oklahoma farmers to farm more sustainably, even organically (minimal to no chemical inputs; aim is for "all natural" growth methods)?

Organic farming is a highly regulated enterprise, and there are certain standards to be met if a farm or product is to be certified. Oklahoma is one of a minority of states able to certify three organic areas, which include organic processing in addition to organic crop and livestock production (McDermott, 2003). A list of currently certified organic

producers is readily available from the Oklahoma Department of Agriculture website; judging by the sustainable and organic farmers the researcher has met through farmers' markets and field days, organic producers are willing to talk about their practices. Thus, by contacting the organic producers in Oklahoma, and using similarly-minded contacts provided through them, we can get a rough idea of the sustainability trend in the state. A survey of organic producers in Oklahoma is needed to gather information regarding the motivations to become more sustainable, as well as any roadblocks, formal or informal, that have to be addressed.

Organic farms were not a category previous to the 2002 Census of Agriculture (before the implementation of the USDA National Organic Program in October of 2002), so there is little formal information to work with in regard to trends. The 2002 Oklahoma Census of Agriculture recorded 6 certified organic farms in the state (Economic Research Service, 2006, Farm Characteristics); a list of certified organic producers updated in December 2006 by the Oklahoma Department of Agriculture, Food, and Forestry has nearly 40 in-state producers and processors listed. Nationwide the land devoted to organic farming is increasing in acreage—from 1.2 million acres in 1997 to 2.3 million in 2001 (Goodall, 2005, p. 161). In 2001, Oklahoma had 3,922 certified organic acres (Agricultural Marketing Service, 2007).

Purpose of the Study

The purpose of this study is to survey organic producers (and those identified as 'non-certified organic') in Oklahoma to examine the characteristics of the people and operations in organic production, the reasons Oklahoma farmers and ranchers cite for

their extent of involvement in organic agriculture, and any barriers they have had to overcome to get to the level of sustainability they have reached.

Research questions

1. What are the demographic patterns that can be identified among those who choose to be organic farmers?

2. What motivates Oklahoma farmers to produce organically?

3. What are the roadblocks to organic production in Oklahoma?

Justification for the Study

The results of this study will show consumers, as well as professionals in the field (such as extension educators), what motivates Oklahoma farmers and ranchers to go through the organic certification process, and any barriers impeding their progress. This information may help improve public perception of agricultural practices in the state, possibly help alleviate some barriers to certification of additional farmers, and give agricultural professionals an idea of the local growth of organic agriculture methods, which can help with planning of extension services.

Definition of terms

Confined animal feeding operation (CAFO) – a farm that raises large numbers of livestock in minimal amounts of space in order to maximize production

Conventional agriculture – "capital intensive, large-scale, highly mechanized agriculture with monoculture of crops and extensive use of artificial fertilizers, herbicides, and pesticides with intensive animal husbandry" (according to Knorr & Watkins, 1984, as cited in Comer et al., 1999, p.30).

Eutrophication – "a process whereby water bodies. . .receive excess nutrients that stimulate excessive plant growth. . .This. . .reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms to die" (USGS, 2006).

Farm – "any place from which $1,000 or more of agricultural products were produced and sold, or normally would have been sold, during the census year" (NASS, 2004).

Family farm -- "farms organized as proprietorships, partnerships, or family corporations" (Hoppe & Wiebe, 2002).

Industrial agriculture – see "conventional agriculture"

Monoculture – continuing to plant the same crop year after year in the same field (Horne & McDermott, 2001).

Natural – "labeling for *meat and poultry* products [when] . . . 1) the product does not contain any artificial flavor. . .coloring ingredient, or chemical preservative. . .or any other artificial or synthetic ingredient; and 2) the product and its ingredients are not more than minimally processed [by] . . .smoking, roasting, freezing, drying, and fermenting, or . . .grinding, . . .separating, . . .and pressing. . . (USDA, 2005)"

Nitrogen fixation – the process by which atmospheric nitrogen is converted into ammonia; occurs in the root nodules of legumes, where symbiotic bacteria use enzymes to convert the nitrogen

Organic agriculture – "An ecological production management system that promotes and enhances biodiversity, biological cycles and soil biological activity. It is based on minimal use of off-farm inputs and on management practices that restore, maintain, and enhance ecological harmony" (from the National Organic Standards Board, as cited in Lotter, 2003, p. 62).

Sustainable agriculture (also known as alternative agriculture)– "an integrated system of plant and animal production practices having a site-specific application that will, over the long term: a) satisfy human food and fiber needs; b) enhance environmental quality and the natural resource base upon which the agriculture economy depends; c) make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls; d) sustain the economic vitality of farm operations; and e) enhance the quality of life for farmers and society as a whole" (as defined by US Congress, 1990, in Food, Agriculture, Conservation, and Trade Act, as cited in Horne & McDermott, 2001, p. 53).

Scope of the study

This study employed a survey of currently state-certified organic producers and processors in Oklahoma, as well as any farmers or ranchers in the process of organic certification, or producing using as many organic methods as possible, such as 'non-certified organic,' or Oklahoma All Natural producers. Both organic farmers and ranchers will be included, as organic methods can be applied to the raising of both plants and animals. Family farms, whether or not they are contracted with a corporation, are the subject of the study. Large corporations are not the subject of the study.

Limitations

While there is a list of certified organic producers in the state, any producers in the process of transition, or that are non-certified organic, will have to be identified through lists such as the Oklahoma Food Cooperative, the Tulsa Green Directory, the Kerr Center's Oklahoma Food Connection, and the snowball effect—identification via other producers or processors.

With any survey, there will be non-response error, both overall and per item. This leads to experimental bias. Results were compared to national surveys that experienced similar errors, so the overall effect should be minimal.

Logical Assumptions

It is assumed that the Oklahoma farmers, ranchers, and processors participating in this research will answer the survey questions to their best ability, are honest and sincere in their answers, and desire to help the researcher get an accurate depiction of Oklahoma organic agriculture in regard to the survey questions.

It is assumed that Oklahoma farmers, ranchers, and processors participating in this research are familiar with farming practices discussed in the survey tool, and that the tool accurately measures producers' responses regarding organic farming and attitudes.

It is assumed that the survey will be a true representation of Oklahoma organic farming—the people involved, their motivations for being involved in organic farming, and the frustrations they face along the way.

CHAPTER II

REVIEW OF LITERATURE

The purpose of this review of the literature is to introduce the results of previous studies regarding sustainable, organic, and conventional/industrial agriculture. The different methods of agriculture and the reasons for their practice will be compared and contrasted, the need for a trend toward more sustainable agriculture will be presented, and the reasons for increasing consumer demand for organic and sustainable farming and ranching will be discussed. In addition, possible barriers to the implementation of sustainable practices will be presented.

Agricultural methods – Industrial (Conventional)

Since World War II, the trend in agriculture has been 'industrial agriculture'. Industrial agriculture practices include: intensive use of fuels, chemicals, and other substances that are manufactured off-site, for the purpose of increasing crop yield; increased mechanization; increased specialization, i.e. 'monocultures'—growing only one crop on the farm; and often the incorporation of new developments in biotechnology, such as genetic engineering, which allows crops to be genetically designed so that they are identical for easy harvesting and processing, allows genes to be incorporated into crops that make them resistant to certain pesticides or deadly to particular pests, or even allows crops to express new qualities, such as vitamins they would not naturally contain. These practices contribute to decreasing labor in both time and costs. This trend has

allowed inexpensive (in terms of direct costs) and abundant food supplies for the world's growing population (Goering et al., 1993; Horne & McDermott, 2001; Schlosser, 2002).

However, with the expenses of industrial agriculture comes a low profit margin, and production must therefore be maximized to minimize risk. Farmers and ranchers are tempted, even forced, to abuse natural resources in order to make a living, especially if they are part of government subsidy programs which encourage maximum output. By abusing natural resources, however, farmers are risking future productivity for short-term profits (Faeth et al., 1991). Issues associated with conventional agriculture include the following:

1. Erosion and degradation of soil—Crops grown in the conventional way—highly tilled soils planted in monocultures—make soils more likely to erode (National Research Council, 1989). Whenever production is maximized by farming or ranching all available land—be it on a hillside, next to a stream, overstocked with sheep or cattle, etc.--the overuse and clearing increase erosion rates. As it takes about 100 years to make one inch of topsoil from bedrock on farms (Poincelot, 1986, p.116), and 500 to 1,000 years to make an inch of topsoil naturally, (Natural Resources Conservation Service, 2006, Slide 22) soil is not a renewable resource in our lifetimes. The loss of fertile topsoil decreases production and increases the need for fertilizers.

Soil is complex material; it is made of gases (in the spaces between soil particles), water, minerals (from the parent material and whatever has washed or blown in from elsewhere), and organic matter such as microorganisms, worms and other small animals, decaying plant and animal matter, feces and other waste products, etc. (Horne & McDermott, 2001). The loss or overabundance of any of these characteristics can affect

crop yields. For instance, over-irrigation can make soil too salty for growing crops. In addition, the bigger farms often have big, heavy machines that compact soil, leading to less absorptive ability (and consequently more runoff and more erosion) (Gold, 1999; Horne & McDermott, 2001).

2. Monocultures. Instead of rotating the crops planted (for instance, alternating grains with legumes such as alfalfa or green beans to increase nitrogen levels in the soil), many farmers engage in monoculture farming—planting the same crop every year (Schlosser, 2002). Farmers often plant monocultures to take full advantage of government subsidy programs for particular crops. Another benefit of planting monocultures is the savings in labor (one planting and harvesting, not one for each different crop) and equipment (no need for a combine and a cotton picker and other specialized machines for each kind of crop), but soils lose fertility when planted with the same crop year after year, and the typical monoculture row crops lead to increased erosion (Horne & McDermott, 2001).

Monocultures also cause large nutrient imbalances—excess nitrogen where livestock (manure) is concentrated, such as in confined animal feeding operations (CAFOs), and less nitrogen in the crop lands where the animals used to be raised alongside the crops (and where now, due to monoculture farming, additional nitrogen must be added artificially). Before monoculture specialization, farmers grew feed for their animals and had natural sources of fertilizer (animal manure) for their land. But with the rise of monocultures came transported feed for animals and transported fertilizer for crops, increasing cost and pollution (Halweil, 2004).

Oklahoma has followed the monoculture trend: between 1930 and 2002, the

number of crop and livestock species raised on at least one percent of Oklahoma farms has dropped from 42 to 23, while the number of crop and livestock species raised on at least ten percent of Oklahoma farms has dropped from 19 to 4 (see Table I).

TABLE I

NUMBER OF SPECIES (CROPS AND LIVESTOCK) PRODUCED ON AT LEAST ONE / TEN PERCENT OF OKLAHOMA FARMS BY YEAR

YEAR	NUMBER ON 1% + OF OKLAHOMA FARMS	NUMBER ON 10% + OF OKLAHOMA FARMS
1930	42	19
1940	38	20
1959	48	14
1974	27	9
1987	24	5
2002	23	4

The four species produced in 2002 on at least ten percent of Oklahoma farms were cattle (71%), hay (44%), horses/ponies (31%), and wheat (12%). We've completely quit producing many kinds of crops—Irish potatoes (from production on 40% of farms in 1940 to none in 2002), barley (13% to none), cherries (10% to none), etc. (Harris & Penick, 2006, pp. 99-102).

3. Chemical dependence. Industrial agriculture is heavily dependent on chemicals such as fertilizers, pesticides, antibiotics and hormones (Schlosser, 2002). This allows more food to be produced at cheaper cost with less labor. But there is much waste--"as much as 25 percent of the fertilizer spread on farmland each year is lost as runoff" (Horne & McDermott, 2001, p.13). Runoff ends up in bodies of water, and can lead to pond and lake eutrophication and anoxic (little to no oxygen) zones, such as the 20,000 km^2 in the Gulf of Mexico devoid of fish (and other sea life) due to excess nutrients washed down the Mississippi River (Gold, 1999; Halweil, 2004; Ribaudo, 2001). Excess nutrients

cause excessive algae growth ("blooms"), and when the algae die, they are decomposed by aerobic bacteria that deplete the oxygen in the water, killing fish and other aquatic life.

Another chemical problem is the overuse of antibiotics. Antibiotics are sprayed on plants to control diseases such as blight, and are fed to livestock to help control diseases in CAFOs as well as increase growth rate. This overuse of antibiotics leads to an increase in antibiotic-resistant bacteria, which weakens our arsenal of disease-battling drugs for all organisms.

4. Water loss. Industrial agriculture is also lowering aquifer levels. Using irrigation, crops can be grown in very dry places. The water for this often comes out of underground aquifers, such as the Ogallala Aquifer in the Great Plains. Unfortunately, the water is being removed faster than it is being naturally replenished, so while it is a renewable resource, it is being stripped away at a nonrenewable rate. This is not sustainable for the long term (Gold, 1999; Guru & Horne, n.d.).

5. Loss of biodiversity. Another problem with industrial agriculture is the mass production of genetically uniform crops and livestock (to be the same size for easy harvest, for high yields, to be resistant to weed killer, etc.). Genetic uniformity is convenient for producers once the 'best' specimen has been engineered through selective breeding or actual manipulation of genes in a laboratory. Cultivation of fields of 'superior' crops nearly guarantees high yields; raising herds of animals in CAFOs that were selected to thrive in confined situations also is a safe wager. But genetic uniformity can also be very risky.

Biodiversity in agriculture is decreasing at an alarming rate. Even 20 years ago, over 90% of the United States' dairy herd was Holsteins, with 400 to 500 bulls siring

65% of the following year's calf crop (artificially) (National Research Council, 1989, p.120). With limited genetic diversity, there is little genetic variation to draw on if the need arises (for instance, as pests adapt to our pest-resistant crops). If emerging diseases, new climates, or new production methods are not a good match with the genes of our engineered organisms, where will we get the genes that may be compatible with the new conditions? The United Nations' Food and Agriculture Organization (FAO) has estimated that agriculture has lost 75 percent of its diversity in the past 100 years (Kimbrell, 2002, p.16).

Genetic engineering can keep farmers from adapting crops to suit their locations or cultures. Farmers using genetically modified seed such as Roundup Ready® Soybeans developed by Monsanto (the pesticide Roundup® is also produced by Monsanto) are becoming increasingly reliant on the huge corporation (Cheeke, 2004). Roundup Ready® Soybeans are resistant to the non-selective herbicide Roundup®, so farmers can spray their fields for weeds and not lose any of their crops to the herbicide. But the seed is patented, and seeds cannot be saved from one crop in order to grow next year's crop—to do so is considered a crime. Monsanto takes "seed pirates" to court—in 1998, a group of Midwestern farmers that saved Monsanto seeds were fined $35,000 each; Monsanto even sued a farmer for saving seeds from plants wind-pollinated with pollen from nearby Monsanto plants (Shiva, 2000, p.92)!

Corporations like Monsanto do modify some of the genes of the soybeans (or corn, wheat, etc.) they patent, but the gene pools they are working with have been selected over hundreds, perhaps thousands, of generations of farmers for their suitability, yield, and other qualities. Food crops were forbidden (on moral grounds) to be patented

in the United States under the 1930 Plant Patent Act, but within 40 years the Plant Variety Protection Act was created to protect the rights of the developers of new varieties of food crops, and the incentive was there to create monocultures of superior plants—all exactly alike (Shand, 2002). The United States is the world leader in the production of genetically modified foods, with 81 percent of soy, 73 percent of canola, 73 percent of cotton, and 40 percent of corn genetically engineered (Goodall, 2005, p. 46).

6. Introduced species. Oklahoma registered 19, 217 Angus cattle in 2005, the fifth highest state in registration numbers (American Angus Association, 2006). Black-skinned Angus are not susceptible to sunburned udders or cancer eye (American Angus Association, n.d.), which helps save money on veterinary bills, but their solid black skin absorbs the sun's heat. In their native (cooler) Scotland this is favorable, but not on hot summer days in Oklahoma. Breeds from western Europe (such as Angus) cannot maintain high production outside of their native environment without intensive management and expensive inputs such as feed and medicine (FAO, 1998). Native plants and animals that are adapted to the local environment are, by nature, less intensive to manage and cheaper to maintain.

Agricultural methods – Sustainable and Organic

"A sustainable agriculture system is one in which the goal is permanence achieved through the utilization of renewable resources (Poincelot, 1986, p.14)." Sustainable practices are essential for staying productive and profitable into the future. Examples of sustainable agricultural practices include (but are not limited to) conserving soil through the use of cover crops, wind breaks, and terracing; limiting water use and not polluting it with pesticides or other chemicals; composting and recycling resources; using

biological pest control (such as ladybugs and praying mantis); growing native species of crops; and raising breeds of livestock that are well-suited for the ranch location (Horne & McDermott, n.d.).

Organic agriculture, one kind of sustainable agriculture, is a highly regulated (in order to be certified 'organic') industry that minimizes the use of chemicals and has a systemic approach to farm management, integrating the soil, crops, and livestock, as well as society itself. Generally, organic farmers oppose biotechnology such as genetic engineering and are often more concerned with preserving the environment than making a profit. Foods certified 'organic' have met stringent standards from production to marketing (Lotter, 2003).

In Oklahoma, farms or parts of farms meeting all of the requirements of the Oklahoma Organic Food Act may be issued a license by the State Board of Agriculture. There are two classes of certification—"Organic Certification" and "Organic Certification-Transitional." The transitional certification is for farmland that has not yet been under three continuous years of organic management, but otherwise meets the requirements of the Oklahoma Organic Food Act (Oklahoma Department of Agriculture, Food and Forestry, n.d.).

The Oklahoma Food Cooperative, which focuses on foods grown locally and with sustainable methods, has several categories within their cooperative to let consumers know how each product was grown or raised. These categories include: Oklahoma Certified Organic (certified by the state), Oklahoma All Natural (non-certified organic), Oklahoma Standard (commercial fertilizer may have been used during production), and Oklahoma Commercial (conventional methods of agriculture were used during

production) (Oklahoma Food Cooperative, n.d., Product Categories).

The need for sustainable agriculture

"The destiny of countries depends on the way they feed themselves" – Anthelme Brillat, 19th century French gastronome-philosopher (Mather, 1995, p.1.)

Americans pay very little for their food. Compared to the rest of the world, the percentage of American income spent on food is one of the lowest, at 9.5 percent. Our Canadian neighbors pay about 12 percent; Mexicans pay about 27 percent. This issue is celebrated annually across the United States as "Food Checkout Day", the day when the average American has earned enough income to pay for their annual food bill. In 2007, Food Checkout Day was on February 6 (Oklahoma Ag in the Classroom, 2007, home page).

Addressing the Real Cost of Food. The apparent cheapness of American food is misleading. Consumers pay much more than the sticker price for their food, both directly and indirectly. They pay money in taxes to subsidize the production of the commodities, as well as the transportation infrastructure that gets the food to them. In addition, fossil fuels are consumed transporting the foods long distance, and much more emissions are released than if all food was bought locally. Dinner in America travels on average 1,300 miles from the farm to the table (Kimbrell, 2002, p.16), while fruits and vegetables often travel 1,500 to 2,500 miles to get to the consumer (Halweil, 2004, p.29).

There is no reason most food should be traveling such distances. Specific foods do not have to be grown in limited geographical areas. Before subsidized transportation systems were in place, and before cold storage was readily available, most food was raised and consumed locally (Hanson, 2007). For instance, in the 1930s, there were

enough peach, plum and pear trees near Lake Michigan to supply the entire country with those fruits (Halweil, 2004). It wasn't the norm for fruit to be grown in Hawaii, California and Florida, corn to come from Iowa, potatoes to be grown mainly in Idaho, etc. But state lobbyists got active and demanded subsidies, and now regions are known for certain products. California became a major produce state by successfully lobbying for subsidized water, fruit research, industry standards, and advertising campaigns (Halweil, 2004). As crops become regional commodities, food transportation increases, because the food has to cross the country to get to consumers in areas where they do not grow particular foods. Food also loses some of its nutritional value during transport. In 1984, 24,000 tons of broccoli were shipped 2,700 miles from California to New York, where it could have been produced anyway. During the journey of two days, the broccoli lost 34 percent of its vitamin C content (Mather, 1995, p. 11).

All the food travel entails more packaging (which uses more fossil fuels), more preservatives (more chemicals to produce), and more chances for contamination (human handling, exposure to heat, etc.). Just the packaging alone is a huge environmental burden, making up 1/3 of landfill waste in some American cities (Halweil, 2004, p. 39).

Money on the Move. Traveling food also takes the money with it. Food bought locally keeps money cycling locally, with more of the money going to the farmers. If Oklahomans spent five percent of their food dollars on locally produced foods, the farmer's share of each "food dollar" would go up 58%, according to one estimate (Harris, 2006, p. 115). Food bought directly from farmers at farmers' markets, roadside stands, through subscription services, or picked in the field lets a larger proportion of the money stay with the farmer (no middlemen, no packaging), and a dollar spent locally generates

about twice as much income for the local economy, since the money stays in the community. Money spent at stores run by large companies such as Wal-Mart leaves the community (Halweil, 2004, p. 54).

Community health is an important aspect of sustainable agriculture. A study completed by an anthropologist with the United States Department of Agriculture, William Goldschmidt, decades ago showed that there is an inverse relationship between farm size and community well-being. Global corporations that use local farmers basically as hired hands are not good for local business or for the local environment. To be efficient, global corporations run production the same way in all locations. The same procedures for fixing problems are followed in all locations, regardless of local resource degradation or depletion. Global corporations have no compelling local ties, unlike the farmers who live in the community (Halweil, 2004).

Chemical Dependence. The overuse of chemicals commonly occurring in industrial agriculture pollutes water, air, and land, and physically harms the workers applying the chemicals (Fishman, 2006). If agricultural pesticides were applied efficiently and only where appropriate, the U.S. Office of Technology Assessment claims that there would be a 60% reduction in pesticide use (Fishman, 2006, p.64). Reduction in pesticide use would help alleviate the current problems of pesticide-resistant pests (plant and animal) and loss of pollinators and other beneficial wildlife, such as pest predators (Gold, 1999). The estimated cost of cleaning up environmental damage from conventional farming's chemical use in the United States is $9 billion each year (Goodall, 2005, p. 169). The overuse of chemicals in the form of antibiotics in agriculture has led to increased antibiotic-resistant bacteria (Gold, 1999), an additional problem for human and

animal health. Sustainable agriculture practices use minimal amounts of chemicals and antibiotics.

Erosion and Degradation of Soil. Farmland is being lost at tremendous rates. Due to urban and suburban sprawl, over 30 million acres of U.S. farmland have been lost since 1970 (Gold, 1999, Economic and Social Concerns, ¶ 3). The topsoil is also being lost to wind and water erosion; this soil often ends up in water sources, where it degrades water quality (Hatfield & Keeney, 1994; Padgitt & Petrzelka, 1994). Much of the land that is left is being compacted by large machinery, as well as losing its nutrients (Horne & McDermott, 2001; Padgitt & Petrzelka, 1994). Sustainable techniques often employ no-till practices, cover crops, and other measures to protect the soil and prevent erosion.

Monocultures. We are losing genetic diversity in our crops and livestock due to artificial selection for the "best" crop to fit current needs and growing conditions. In the United States, 99 percent of the potatoes produced come from one of just four related potato varieties (Halweil, 2004, p. 71). This lack of genetic diversity leaves our agriculture vulnerable to diseases that can easily infect and potentially wipe out entire crops or herds of genetically similar organisms (Poincelot, 1986). This fact was graphically illustrated by the Irish Potato Famine in the 1840s, which led to a 50% reduction in the population of Ireland due to death or emigration. The potatoes grown in Ireland were a major food source, but were of few varieties. Unfortunately those varieties were susceptible to *Phytophthora infestans,* which rotted the potatoes. Other varieties of potatoes have been found to be resistant to *P. infestans* (Caldwell & Lindberg, n.d.; Horne & McDermott, 2001; Mather, 1995).

Loss of Biodiversity. Groups such as the American Livestock Breeds

Conservancy understand the importance of genetic diversity and are working to keep so-called “minor breeds” (the livestock breeds that are no longer common in industrial agriculture) from becoming extinct. No one knows exactly what the future environment will be like; producers might need the heat, humidity, and insect tolerance genes from the Florida Cracker cattle, or the resistance to internal parasites of the St. Croix sheep (American Livestock Breeds Conservancy, Thomas, & Vroegh, 1996; Olson, 2005). Many sustainable farms raise multiple crops and breeds of livestock; this preserves biodiversity while decreasing their personal risk.

The world population is increasing. The land available to grow food on is decreasing. We need to make the most of what arable land is left. It has been shown that sustainable practices can actually increase production at the same time that they decrease pollution, erosion, and chemical exposure, and we need to start implementing more of them: “The human species is part of nature. Its existence depends on its ability to draw sustenance from a finite natural world; its continuance depends on its ability to abstain from destroying the natural systems that regenerate this world (Horne & McDermott, 2001).”

Increasing demand for sustainable and organic products

In the United States, several factors have increased sales of organic products and caused a 25-fold increase in the number of farmer’s markets since the 1960s. These factors include concerns for personal and family health, food safety, and the environment, among others. Over half of Oklahoma City shoppers surveyed by the Kerr Center said that they purchase organic or natural foods “occasionally”, “frequently”, or “always”, with health and safety as their primary concern (Harris, 2006, p. 134). Consumers have

reported that they thought organic foods were healthier and tastier; and that organic foods are more environmentally friendly than conventionally grown foods. Fear of pesticide residues, transgenic foods, and dairy products from cows being given hormone injections have also been cited as reasons for increased demand of non-conventionally grown foods (Lotter, 2003, p.68, ¶ 4). A "Go Organic!" for Earth Day survey conducted by the National Marketing Institute in 2005 found that 65% of certified organic food buyers buy them because they are assured freedom from pesticides and antibiotics (Harris, 2006, p. 135).

A 2001 survey of farmers' market customers in Oklahoma indicated that 46% of customers think it is "very important" to have fresh produce "free of chemical residues". In terms of the availability of organically grown produce at their farmers' market, 51% of customers think it is "somewhat important," and 31% think it is "very important" to have organic produce available (Walton, 2006, p.12). The 2002 Institutional Food Service Survey in the 2003 Oklahoma Farm to School Report states "less use of pesticides" as one of the top motivations (for 23% of the respondents) to buy Oklahoma-produced foods for Oklahoma schools, prisons, hospitals, etc (Harris, 2006, p.33).

A study done in Ohio in 2002 showed that those consumers are most concerned about food safety and humane animal treatment. Five hundred non-farmers in the study also mentioned concern for the environment as well as bio- and agroterrorism. There wasn't much concern about genetically modified crops (Rapp, Knight, & Dixon, 2002), but perhaps there should be. Secondary pests in China have been attacking Bt cotton, cotton with the *Bacillus thuringiensis* gene inserted, that was genetically modified to target bollworms (and is only toxic to leaf-eating bollworms). Seven years after first

planting Bt cotton, Chinese farmers are reporting needing to spray their fields up to 20 times a season to control secondary pests, such as leaf bugs, that are not affected by the Bt gene. With pesticide application equaling the rate of conventional cotton farmers, the crop isn't protecting the environment any more than conventional cotton does, and Bt cotton farmers are losing money; seeds for Bt cotton costs three times as much as seeds for conventional cotton. Possible solutions for this secondary pest problem include introducing natural predators of the secondary pests (organic), or planting refuge areas of non-Bt cotton next to fields of Bt cotton as is done in the United States. In refuge areas, non-Bt cotton fields prevent bollworms from becoming resistant to Bt cotton, and broad-spectrum pesticides used in the refuge areas keep secondary pests under control (Lang, 2006).

Reports have cited that consumers are willing to pay between 10 and 30% more for organic foods before switching back to conventionally grown food (Lotter, 2003, p.68, ¶ 4). Oklahoma farmers are cashing in on the niche markets opening up in organic production. Recently one eastern Oklahoma vegetable farmer raised twenty thousand dollars worth of vegetables on just four acres; a northern Oklahoma wheat farmer got twice market price for his organic wheat (McDermott, 2003).

Consumer interest is also increasing regarding the nutritional characteristics of pasture-raised (grass-fed) beef (Lozier, Rayburn, & Shaw, 2004). Meat from grass-fed cattle is up to six times higher in omega-3 fatty acids than meat from cattle raised in animal feeding operations; meat and milk from grass-fed animals are also lower in saturated fats and cholesterol and higher in vitamin E than products from their feedlot counterparts (Goodall, 2005, p. 104). Internationally, interest in organic food is driven by

concerns regarding antibiotic use in animal feed, bovine spongiform encephalopathy, and foot and mouth disease (Vogl, Kilcher, & Schmidt, 2005).

Concerns for health and food safety have played a key role in the formation and growing popularity of community-supported agriculture (CSA). Community-supported agriculture got its start in the United States (in Massachusetts and New Hampshire) when the idea was brought over in the mid 1980s from Switzerland. Members of a CSA farm buy shares of a farm (with dividends paid out in weekly or monthly food allotments, depending on the size of shares purchased) to help with farming costs and give the farmer an assured income, and to minimize the farmer's risks (and worries) by assuring a market for his products throughout the season. Depending on the individual CSA farm, some members are encouraged to help on the farm with planting and harvesting, tending to livestock, or other chores. Many members join not only for the food safety or health factors of the food they get on a weekly or monthly basis, but for the spiritual or psychological benefits they get by working on the farm (Mather, 1995; Tegtmeier & Duffy, 2005). CSA farms appear to practice mostly organic agriculture; the 1999 National CSA Farm Survey, with a 45% response rate, showed that 91.6% of the 312 responding CSA farms practice either certified or non-certified organic agriculture (Lass, Stevenson, Hendrickson, & Ruhf, 2003).

In 2003, U.S. organic food sales reached $10.38 billion; sales of organic foods have grown 17-21% a year since 1997 (Organic Trade Association, 2005, Organic Food Facts, ¶ 1). Contrary to popular belief, all organic buyers are not upper-class. One-third of American frequent organic buyers make under $15,000 a year; the mean income of frequent organic buyers is $43,280 (Goodall, 2005, p. 168). Organic products are in such

high demand that organic farmers can't fill the need; the US imported between $1 and $1.5 billion in organic products in 2002 (Strochlic & Sierra, 2007).

Interestingly enough, it is not just human consumers that prefer organic products. There are numerous examples of animals, both wild and domestic, voluntarily avoiding genetically-modified foods, both processed and while still in the field. Wild geese, cattle, hogs, raccoons, deer, chimpanzees, tapirs, mice, and rats have all been documented avoiding genetically modified food when given the choice between identical foods—one organic, one genetically modified (Goodall, 2005).

Cited Farmers' Reasons for Pursuing Organic Methods

A literature review in a February 2007 study of conventional, mixed, and "deregistered" organic farmers in California cited four main reasons for farmer pursuit of organic methods: 1) concern for the environment, 2) less chemical exposure, 3) higher profit margins, and 4) increasing environmental regulations (Strochlic & Sierra, 2007).

The results of the Fourth National Organic Farmers' Survey, conducted in 2003, showed that the 1,003 organic respondents ranked land stewardship and ecological sustainability, as well as chemical avoidance, highest on their reasons for farming organically. These were followed by "organic represents good farming practices—like the results," "ecological principles—view farm as ecological system," and "quality of organically grown products." Organic price premiums were ranked eleventh out of the seventeen categories (Walz, 2004).

Motivation to adopt sustainable agriculture practices, or BMPs (best management practices), has been documented for reasons as diverse as recent contact with National Resources Conservation Service (NRCS) personnel (Kim, Gillespie, & Paudel, 2005), an

Environmental Distinction Awards Program (Nadeau & Meader, 2003), and the desire to reduce pollution (Drost et al., 1996). Implementing BMPs usually requires a behavior change, a complex process involving six steps ranging from precontemplation to internalization (Clements, 1999). We cannot expect people to change overnight, but we can determine the best methods for getting people a few steps closer to our goal.

Barriers to the implementation of sustainable agriculture techniques

Sustainable agriculture is not easy. It involves more labor than chemicals, more planning than planting. While the general public may favor it, a farmer's community may be leery and non-supportive of it. There is cultural pressure to do things the way they've always been done (Carolan, 2005). The CEO of Organic Valley, George Siemon, notes, "Farmers are traditionalists . . . We have dairy farmers that could go organic now, but they are hard pressed to change their milk hauler or feed mills because it is based on the relationships. We come to them and say, throw all your traditional relationships away and work with us and that is hard for them (Strochlic & Sierra, 2007, p.6)."

Beyond the community, even the government seems to be against the alternative farmer. In the words of one Virginia organic farmer, "Not only is there not government support for what we do, there is a profound antagonism at every level for what we do" (Goodall, 2005, p.176). It might take a few years to understand new methods; family finances may temporarily suffer due to certification costs, higher labor costs, and losses due to weeds and pests (Strochlic & Sierra, 2007). During the three-year transition period, no organic premiums are being gleaned, the organic learning curve is being dealt with, the field ecology is changing as chemical use is withdrawn, labor is increasing—those are challenges that new organic farmers must get through successfully in order to

see the profitable side of organic agriculture (Duram, 2006). With the barriers in front of farmers and ranchers contemplating sustainable techniques, it is no wonder so many still cling to convention.

Sustainable techniques are labor-intensive. Weed control, for instance, is essentially done by hand in organic agriculture, where chemicals aren't allowed. In conventional farming methods, soybeans are genetically engineered to resist the herbicide Roundup®, which is then sprayed on the fields for weed control. This isn't allowed in organic farming methods (Fishman, 2006). Sometimes herbicide drift from the neighboring farms can even keep a farmer from being certified organic, as was the case with some wheat land in Oklahoma owned by Springhill Farm (Harris, 2006, p. 128).

The organic food industry is a relative newcomer to the field of agriculture, having started within the last 30 years. Theoretical knowledge is plentiful in the area, but actual technical knowledge is scarce. Compared to the research, support payments, and programs that exist for conventional farming techniques, there are very little for sustainable programs (Drost, Long, Wilson, Miller, & Campbell, 1996; Fishman, 2006). In addition to more technical knowledge, there will have to be a paradigm shift--sustainable agriculture incorporates culture as well (Bird, Bultena, & Gardner, 1995; Fishman, 2006; Padgitt & Petrzelka, 1994).

Some agriculturalists do not have a chance to choose their farming or ranching methods. Farmers and ranchers are losing their land and/or independence, and some are farming on rented land; they don't have the ability to make decisions about their production practices (Cochran, 2003). United States agriculture has gradually come to be controlled by a few major corporations. In terms of the world market, 2 companies

control 75 percent of the cereals and 5 companies control 75 percent of the vegetable seeds; in the United States, 4 companies pack 80 percent of the beef and just 6 companies control 75 percent of pork packing (Halweil, 2004, p. 47). These vertically integrated oligopolies drive down prices for food, while increased production capability floods the market.

Sometimes farmers and ranchers make less on the harvest than what they put into the product. For instance, about 2 cents of every $1.50 spent on fast food French fries goes to the potato farmer (Schlosser, 2002, p.117). From 1910 to 1997, the amount of each food dollar in the United States that went back to the farmer dropped from 40 cents to just 7 cents (Halweil, 2004, p. 45). Assuming stable yields and prices, in order for the American farmer to keep the same income, his farm today would have to be about six times bigger than in 1910. Farmers and ranchers feel pressured to increase their production or get out of the business. In order to keep their land, many farmers and ranchers contract with large companies, essentially becoming a tenant farmer on their own land (Schlosser, 2002). Most of Oklahoma's poultry producers are contracted with large corporations such as Tyson (Hatfield, 1998).

Government programs, such as those for conservation and commodities, were originally intended to support farm income and expand exports, among other goals. However, they also provide incentives to farm conventionally, working monocultures year after year on as much land as possible, using chemicals to increase production. It simply does not make good financial sense to switch to sustainable farming methods (Bird et al., 1995; Hatfield & Keeney, 1994).

There is much resistance to and controversy about sustainable agriculture in the

agricultural community. Agriculturalists are proud of their accomplishments using conventional agriculture (food that tastes good and even looks aesthetically appealing—Strochlic & Sierra, 2007), and to some of them, bringing up the issue of sustainability implies that they have not been employing *any* sustainable techniques, which they find insulting (Gold, 1999). Some farmers may still be incorrectly assuming, as was common in the early years of adoption, that *all* sustainable methods will lead to reduced yields and therefore not be economically feasible (Hatfield & Keeney, 1994). They may also incorrectly assume that the expected reduced yields will raise food costs, require more labor, and even undermine agribusinesses (Bird et al., 1995).

Some farmers and ranchers may not even be aware that they are *not* practicing sustainable techniques. It has been documented that farmers may be aware of sustainability problems in agriculture in general, but not when thinking of their own facilities. This could be due to denial, ignorance, confusion, or inaccuracy (Padgitt & Petrzelka, 1994). Farmers and ranchers may also not be aware of alternative practices to conventional methods, have no financial or ideological motivation to change methods, or simply lack the resources (time, record-keeping, etc.) necessary to make the change to sustainable practices (Padgitt & Petrzelka, 1994). In addition, if there is no nearby market where they are sure to sell their organic crops or livestock for a premium, or if they perceive the market as already saturated, the risk of leaving behind established buyers may be too great (Strochlic & Sierra, 2007).

Another barrier to organic adoption by small farmers is the growth of industrial organic farms. Though organic labels in stores may seem to come from family farms, with names such as Walnut Acres, Stone Mill, Cascadian Farm, Breadshop, French

Meadow, etc., they are often brands that are strategically allied with or have been acquired by major food processors. In November 2006, 16 of the top 25 food processors in North America were involved in the organic food industry. Tyson, Kraft, General Mills, Dole, Kellogg, Campbell Soup, are perhaps to be expected, but even companies like Anhueser-Busch, M&M Mars, Pepsi, Hershey Foods, and Coca-Cola are introducing or acquiring organic labels (Howard, 2006)! Often, these organic crops are raised the conventional way—in monoculture, with off-farm fertilizers, using large amounts of fossil fuels and water, in order to mass produce products for consumers many miles away. These industrial organic corporations have pressured the United States Department of Agriculture to relax the organic certification standards—to allow genetic modification, growth hormones, irradiation, the use of sewage sludge, etc. So far, public outcry has prevented the conformation of organic farming to fit industrial production, although there are no regulations that limit the amount of fossil fuels, water, or packaging used with organic products (Goodall, 2005).

Companies like Wal-Mart, who offer customers organic products with low markups, can hurt the organic premiums. Imported organic goods from countries with low labor costs or agricultural subsidies can create competition. Even companies that are not organic, but that stop using hormones or antibiotics, can hurt the organic market by drawing away buyers who are only looking to get away from certain chemicals (Strochlic & Sierra, 2007).

The Organic Certification Process in Oklahoma

Oklahoma has one of the 56 (as of April 27, 2007) domestic USDA accredited certifying agents for the National Organic Program (National Organic Program, 2007).

Any farm, ranch, or processing facility (or portion of such) producing or processing crop, livestock, or value-added products that will be sold, labeled, or represented as "100% organic" must be certified by this agent. The Oklahoma agent is in the Organic Food section of the Oklahoma Department of Agriculture, Food, and Forestry (Oklahoma Department of Agriculture, Food, and Forestry, n.d.). As a result of the Organic Foods Production Act of 1990, there are uniform organic standards throughout the nation; all producers and processors must be in compliance with the same national standards, which went into full effect on October 21, 2002, to be certified organic (Kuepper, 2002).

To become certified organic in Oklahoma, a producer or processor first fills out an application. The Oklahoma applications are over ten pages long, and include detailed questions covering soil types, water sources, legal descriptions of land parcels, field layouts and maps of all buildings, information on seeds and transplants, width of buffer zones between organic and non-organic fields, field cropping history and rotation plans, fertilization history per field, soil building plans, pest control plans, weed control plans, contamination prevention plans, post-harvest crop handling plans, the sources of all animals on the farm, feed ration tables (with ingredients, by percent, and identified as organic, conventional, or transitional feed ingredients), plans for emergency feed supplies, rodent and fly control plans, feed storage descriptions, water test results, dimensions of livestock housing, descriptions of animal bedding, cleaning procedures, light sources, length of time animals are indoors (by season), health management plans, parasite and predator control plans, surgical practices, manure management practices, estimated quantity of manure generated per year, slaughtering procedures, type and length of transport for slaughter animals, description of animal identification system,

description of record keeping systems, types of marketing procedures, etc. Also, documents such as organic product labels, directions to the property, water test results, pasture history sheets, etc., have to be attached to the application (ODAFF, n.d.).

After the application has been received and reviewed by the certifying agent, an on-site inspection is performed, along with an exit interview. At that time, irrigation water and soil tests will be done to detect any chemicals, at the same time establishing a baseline against which to compare future samples. If the organic food program director grants certification upon his final review, the certified producer or processor will still have to keep records on all of his organic practices for at least five years, grant immediate access to all property at any time to inspectors, and notify the certifying agent of any operation changes or chemical drift from neighboring fields (ODAFF, n.d.).

There are also annual fees to be paid for organic certification. The fees range from $100 to $300 annually, depending on acreage, number of livestock, and type of processing. Until September 30, 2006, the Oklahoma Department of Agriculture, Food and Forestry (ODAFF) and the United States Department of Agriculture's National Organic Program had a cost-share assistance program for applicants getting certified through the ODAFF that would help with up to 75% of the certification cost, to a maximum of $500 per year (Kuepper, 2002; ODAFF, n.d.).

Producers or processors grossing less than $5,000 a year from organic sales are exempt from certification (though they may still choose to go through the certification process). They may sell their products as "organic," but not as *certified* organic, and may not sell their products to be used as part of a certified organic product. They must still comply with all organic production, labeling and handling requirements; be registered

with the ODAFF as exempt; pay a $20 annual fee; and sign an annual attestation form that they follow all organic standards (ODAFF, n.d.). Anyone knowingly labeling or selling a product as organic that is not organic under the Organic Foods Production Act of 1990 can be fined up to $10,000 per violation (Organic Foods Production Act, 2005).

Summary

This review of the literature discussed the major aspects of industrial (conventional) farming and sustainable (with organic) farming, the need for sustainable farming practices, the increasing demand for sustainable and organic products, cited reasons for farmers pursuit of organic practices, potential barriers to the adoption of sustainable agriculture practices, and the organic certification process in Oklahoma. We still do not know much about Oklahoma farmers and ranchers and their involvement with sustainable or organic practices. A study to determine the types of Oklahoma farmers and ranchers who choose to farm organically, and their motivations for doing so, as well as any roadblocks they encounter while attempting to produce organically, would be useful in improving public perception of agricultural practices in the state, possibly help alleviate some of the barriers to organic production or certification of additional Oklahoma producers, and help extension personnel and other agricultural professionals realize the extent of organic production in the state, which can help with planning of extension services and prioritization of resource distribution.

CHAPTER III

METHODOLOGY

Research Design

This study was a mixed methods study. Questionnaires were distributed to certified organic producers and processors in Oklahoma, as well as any identified as working toward organic certification (or using as many organic practices as possible, i.e. 'non-certified organic'). The questionnaires included checklist and free response items, and were mailed to participants. The questions allowed the researcher to determine who is most likely to participate in organic agriculture, as well as the variety of incentives for doing so and any roadblocks impeding their progress in the state of Oklahoma.

Questionnaire Design

The Dillman Total Design Method (Dillman, 1978) was used for this survey. The Total Design Method is a procedure designed to maximize response to surveys by decreasing the respondent's costs for responding, maximizing the respondent's rewards for responding, and establishing trust that any promised rewards (such as a copy of the finished product) will be delivered. The procedures for constructing questionnaires and implementing mail surveys are very specific, from what size font to use, to designing the cover and selecting the mail out date. Anything that is thought to have an effect on response rate is part of the Dillman Total Design Method. For example, white space is maximized to make the survey seem less complex and make it more likely to be

completed. The total number of pages is limited to no more than 12, so that the respondent doesn't begin to feel overwhelmed and quit the survey. Demographic data are collected last, after the respondent has completed the survey (and is less likely to want to discard the survey at that point), etc.

Questions designed to collect quantitative as well as qualitative data were asked throughout the survey, a process known as triangulation mixed methods design (Gay, Mills, & Airasian, 2006). Both numerical and narrative data were collected as a way to more thoroughly understand the certified organic producers of Oklahoma.

Participants

The population used in this study was the certified and non-certified organic producers and processors in the state of Oklahoma. Oklahoma has almost 40 certified organic producers and processors, according to the Oklahoma Department of Agriculture, Food, and Forestry. Using lists of producers available through the Oklahoma Food Cooperative, the Kerr Center's Oklahoma Food Connection, and the Tulsa Green Directory, as well as the snowball technique, where respondents identify other potential respondents, the researcher aimed to end up with a potential population of around 75 Oklahoma certified and non-certified organic farmers and processors.

Included in the survey were characteristics of the principal operator (age, gender, level of education, etc.), characteristics of the operation (number of acres, crops or livestock raised, number of years in operation, etc.), reasons for using organic techniques, and any barriers which slowed down or prevented full implementation of organic practices. Before the researcher distributed the survey, the survey was reviewed by a jury of professionals in the field to determine if it appeared valid and complete.

Instrument

The survey (Appendix A) was self-developed by the researcher. It was a series of questions regarding the specific characteristics of the operation and its principal operator, reasons for practicing organic agriculture, and any barriers faced or overcome while pursuing organic methods of production or processing. Its purpose was to gather information on the characteristics of Oklahoma producers and processors, their motivation to practice organic agriculture, and any barriers to their involvement in such.

The questionnaire was validated by professionals from the State Department of Agriculture, special education teachers, high school English teachers, and some farmers and ranchers, to make sure that it was understandable, had clear instructions and low-level vocabulary, was complete and succinct, and comfortable to read and work with (font size, white space, etc.). The researcher also worked with the professionals to check for construct validity, content validity, item validity, and sampling validity.

Procedure

After gaining approval from the Institutional Review Board (Appendix B), a postcard (Appendix C) was sent to the selected participants indicating that a survey regarding organic agriculture in Oklahoma was in the mail. A few days later, the surveys were sent to the selected participants with a cover letter (Appendix D) enclosed. The cover letter served to introduce the survey to the potential respondents, as well as meet Institutional Review Board requirements. The cover letter informed the potential respondents of the survey's purpose, guaranteed respondent confidentiality and anonymity, and gave an overview of the content of the survey.

It also served as a consent form, gave contact information for the researcher and the Institutional Review Board members, identified a date by which the survey should be returned, and included a pre-addressed and stamped return envelope, as well as a two-dollar bill (for incentive purposes). At the bottom of the cover letter was a place for respondents to fill in their name and address if they wished to receive a copy of the survey results. Surveys were accepted from the time of the mail out (the end of March 2007) until May 14, 2007 (when the postal rate increased).

Data Analysis

The responses to each survey item from returned questionnaires were entered into an online survey software program, SurveyMonkey.com. When all survey information had been entered into the software, the researcher analyzed the data, looking at frequency and percentage of responses, searching for patterns and trends in responses, such as the most common motivations and barriers cited by farmers.

Looking for trends among the data collected allowed the researcher to determine the status of organic agriculture in Oklahoma—mainly who is practicing it, and why. It also showed common barriers to the practice of organic agriculture in the state, and should help give extension educators and other agricultural professionals an idea of what approaches they need to take or methods they need to use in order to successfully motivate more sustainable or organic practices in the state, in addition to the information that is perceived as lacking by the practicing organic producers and processors in Oklahoma.

The survey was designed for descriptive analysis in that the study was an initial attempt to determine the current status of organic agriculture in Oklahoma. As a result,

the analysis of data is descriptive in nature rather than inferential in design.

CHAPTER IV

FINDINGS

Introduction

The purpose of this chapter is to identify demographic commonalities among Oklahoma organic growers and processors, identify the most frequently cited reasons that Oklahoma organic producers decide to farm using organic methods, and to identify what Oklahoma organic producers consider to be the most frustrating barriers to organic production. The population of this study was the 39 Oklahoma producers and processors identified by the state as being certified organic (as of December 13, 2006), as well as 95 others determined to be using organic growing methods, identified through lists available through the Oklahoma Food Cooperative website, the Tulsa Green Directory, and the Kerr Center's Oklahoma Food Connection Directory, as well as through other organic producers via the snowball effect.

A mail survey was conducted from March through May 2007. Seventy-eight of the 134 surveyed producers responded to the survey (a 58.2% response rate), of which 61 (78.2% of the respondents) classified themselves as either organic certified, organic certified-transitional, or Oklahoma all natural (non-certified organic equivalent). Since this study focuses on Oklahoma organic producers, the results will focus on these 61 producers. Sixteen of the 39 certified organic producers and processors in the state responded, for a 41.0% certified response rate.

Findings of the Study

Research Question One: "What are the demographic patterns that can be identified among those who choose to be organic farmers?" The number (N) and percentage (%) of organic farmers who grew up on farms or ranches (Survey Question #1) are presented in Table II. The responses indicated that the majority (59%) of responding organic growers in Oklahoma were either raised on farms or ranches, or else spent some significant amounts of time on them, through summer vacations, work, or other opportunities while growing up.

TABLE II

DISTRIBUTION OF ORGANIC RESPONDENTS
RAISED ON A FARM OR RANCH

Raised on farm/ranch?	**Yes** **N (%)**	**Some (Summers, etc.)** **N (%)**	**No** **N (%)**
Organic Certified	6 (37.5%)	2 (12.5%)	8 (50%)
Organic Certified-Transitional	1 (50%)	1 (50%)	0 (0%)
Oklahoma All Natural	14 (32.6%)	12 (27.9%)	17 (39.5%)
Organic Total	**21 (34.4%)**	**15 (24.6%)**	**25 (41%)**

The number (N) and percentage (%) of responding Oklahoma organic farmers according to gender (Survey Question #15) are presented in Table III. In each subcategory (certified, certified-transitional, and Oklahoma All Natural) and overall, males involved in organic agriculture outnumber females involved in organic agriculture. Through all four National Organic Farmers' Surveys, from 1993 through 2001, male respondents have always outnumbered female respondents. In those surveys, ranging

from 532 to 1,171 respondents per year, female respondents have represented between 21 and 24% of respondents, while males have represented between 76 and 79% of respondents (Walz, 2004, p.103). Oklahoma organic respondents appear to follow the national trend when it comes to having more males involved in organic agriculture, but that is not surprising; ninety percent of farmers in general in the US and in Oklahoma are male (Harris, 2006, p.75).

TABLE III

DISTRIBUTION OF ORGANIC RESPONDENTS
BY GENDER

Gender	**Male** **N (%)**	**Female** **N (%)**
Organic Certified	11 (68.8%)	5 (31.2%)
Organic Certified-Transitional	2 (100%)	0 (0%)
Oklahoma All Natural*	24 (57.1%)	18 (42.9%)
Organic Total	**37 (61.7%)**	**23 (38.3%)**

* One nonrespondent.

Table IV shows the ranges of ages (Survey Question #13) of responding Oklahoma organic growers. In each organic subcategory (certified, certified-transitional, and Oklahoma All Natural) and overall, the highest number of producers (62.4 %, 100 %, and 71.5 %; overall 70 %) are between ages 40-59. This also follows the national trend for organic farming: the last two National Organic Farmers' (OFRF) Surveys (1997 and 2001) show the highest numbers of organic producers between ages 41 and 60 years of age. In 1997, 63% of 1,176 responding organic producers were between 41 and 60; in 2001, 67% of 1,005 respondents were between 41 and 60 (Walz, 2004, p.102).

TABLE IV

DISTRIBUTION OF ORGANIC RESPONDENTS
BY AGE (YEARS)

Age	**< 30 N (%)**	**30-39 N (%)**	**40-49 N (%)**	**50-59 N (%)**	**60-69 N (%)**	**70+ N (%)**
Organic Certified	3 (18.8%)	0 (0%)	5 (31.2%)	5 (31.2%)	2 (12.5%)	1 (6.2%)
Organic Certified-Transitional	0 (0%)	0 (0%)	1 (50%)	1 (50%)	0 (0%)	0 (0%)
Oklahoma All Natural*	0 (0%)	2 (4.8%)	12 (28.6%)	18 (42.9%)	8 (19%)	2 (4.8%)
Organic Total	**3 (5%)**	**2 (3.3%)**	**18 (30%)**	**24 (40%)**	**10 (16.7%)**	**3 (5%)**

* One nonrespondent.

Table V illustrates the time spent farming or ranching (Survey Question #14) by organic producers in Oklahoma. Thirty four organic producers (58.6% of the respondents) consider themselves full-time farmers or ranchers, and 20 (34.5% of the respondents) consider themselves part-time farmers or ranchers. Only four (6.9% of the respondents) consider themselves weekend farmers or ranchers. Again, this follows the national trend for organic farmers: the 1997 OFRF Survey (1,173 respondents) records 62% full time organic respondents and 38% part time; the 2001 OFRF Survey (1,020 respondents) records 67% full time organic respondents and 33% full time (there was no category for weekend farmers in either survey) (Walz, 2004, p.96).

TABLE V

DISTRIBUTION OF ORGANIC RESPONDENTS
BY TIME SPENT FARMING PER WEEK

Farmer/Rancher Classification	**Full-Time N (%)**	**Part-Time N (%)**	**Weekend N (%)**
Organic Certified*	12 (80%)	3 (20%)	0 (0%)
Organic Certified-Transitional	1 (50%)	1 (50%)	0 (0%)
Oklahoma All Natural†	21 (51.2%)	16 (39%)	4 (9.8%)
Organic Total	**34 (58.6%)**	**20 (34.5%)**	**4 (6.9%)**

* One nonrespondent. † Two nonrespondents.

The majority of responding Oklahoma organic producers (43.1% of the respondents) operate farms or ranches that are up to ten acres in size (Survey Question #8), with 55.2% operating farms or ranches 50 acres or less in size, as indicated in Table VIa. Only 8.6% farm between 501 and 1,000 acres. This is consistent with national organic data; 51% of 1,003 organic respondents to the 2001 OFRF Survey farm a total of 49 or fewer acres; six percent farm between 500 and 999 acres (Walz, 2004, p.27).

The majority of the organic producers (44.8% of the respondents) also put most of their operations (76-100%) into organic production (Survey Question #9, Table VIb). The one certified organic respondent that did not have any land in organic production is a certified cold storage facility; the 23.8% of Oklahoma All Natural producers with no land in organic production present a measurement error—they may have been referring to the legal use of the word "organic" when completing the survey—they may have land in non-certified organic production, but answered the question assuming the legal definition

(since they are not certified organic, they wouldn't have any organic production land under the legal definition).

TABLE VIa

DISTRIBUTION OF ORGANIC RESPONDENTS
BY SIZE OF OPERATION

Number of Acres	**≤ 10** **N (%)**	**11-50** **N (%)**	**51-100** **N (%)**	**101-250** **N (%)**	**251-500** **N (%)**	**501-1000** **N (%)**	**1001-2500** **N (%)**	**2501+** **N (%)**
Organic Certified*	5 (35.7%)	1 (7.1%)	1 (7.1%)	1 (7.1%)	3 (21.4%)	1 (7.1%)	0 (0%)	2 (14.3%)
Organic Certified-Transitional	0 (0%)	1 (50%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Oklahoma All Natural†	20 (47.6%)	5 (11.9%)	0 (0%)	6 (14.3%)	4 (9.5%)	4 (9.5%)	3 (7.1%)	0 (0%)
Organic Total	**25 (43.1%)**	**7 (12.1%)**	**1 (1.7%)**	**8 (13.8%)**	**7 (12.1%)**	**5 (8.6%)**	**3 (5.2%)**	**2 (3.4%)**

* Two nonrespondents. † One nonrespondent

TABLE VIb

DISTRIBUTION OF ORGANIC RESPONDENTS BY
PERCENTAGE OF OPERATION USED TO PRODUCE ORGANICALLY

Organic % of Land	**None N (%)**	**< 10% N (%)**	**10-25% N (%)**	**26-50% N (%)**	**51-75% N (%)**	**76-100% N (%)**
Organic Certified†	1* (7.1%)	3 (21.4%)	0 (0%)	1 (7.1%)	0 (0%)	9 (64.3%)
Organic Certified-Transitional	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (100%)
Oklahoma All Natural‡	10 (23.8%)	6 (14.3%)	3 (7.1%)	6 (14.3%)	2 (4.8%)	15 (35.7%)
Organic Total	**11 (19%)**	**9 (15.5%)**	**3 (5.2%)**	**7 (12.1%)**	**2 (3.4%)**	**26 (44.8%)**

† Two nonrespondents * organic certified cold storage facility ‡ One nonrespondent

Almost two-thirds of the responding organic farmers (64.9%) have been producing 15 years or less, with 26.3% producing no more than 5 years (Survey Question #16). Less than nine (8.8) percent of responding organic farmers have been farming 16-

20 years. Only 26.4% of the respondents have been producing for over 20 years (Table VII and Figure 5). These numbers suggest that, compared to the national organic trend, Oklahoma organic farmers tend to be younger than their national counterparts. Over the four OFRF Surveys, responding organic farmers with 15 years or less experience have decreased from 60 percent to 44 percent of the total respondents; farmers having five or fewer years experience represented no more than 22 percent, and most recently12 percent, of the total respondents. Farmers with 16 to 20 years experience have decreased from 18 percent to 11 percent of the total; and farmers with over 20 years experience have steadily increased from 22 percent to 45% of the total (Figures 1-4) (Walz, 2004, p.92).

TABLE VII

DISTRIBUTION OF ORGANIC RESPONDENTS
BY NUMBER OF YEARS FARMING/RANCHING

Number Years Farming	**<5** **N (%)**	**6-10** **N (%)**	**11-15** **N (%)**	**16-20** **N (%)**	**20-25** **N (%)**	**25+** **N (%)**
Organic Certified*	4 (28.6%)	2 (14.3%)	2 (14.3%)	1 (7.1%)	2 (14.3%)	3 (21.4%)
Organic Certified-Transitional	1 (50%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)
Oklahoma All Natural†	10 (24.4%)	7 (17.1%)	10 (24.4%)	4 (9.8%)	1 (2.4%)	9 (22%)
Organic Total	**15 (26.3%)**	**9 (15.8%)**	**13 (22.8%)**	**5 (8.8%)**	**3 (5.3%)**	**12 (21.1%)**

* Two nonrespondents. † Two nonrespondents.

Figure 1

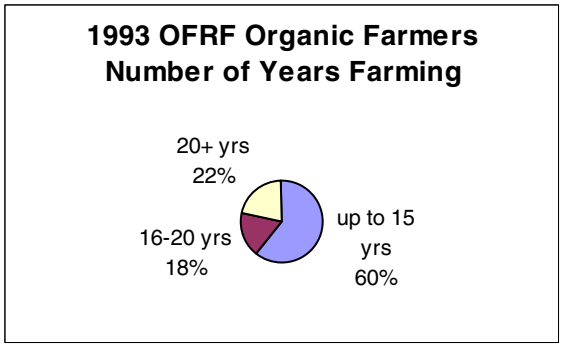


Figure 2

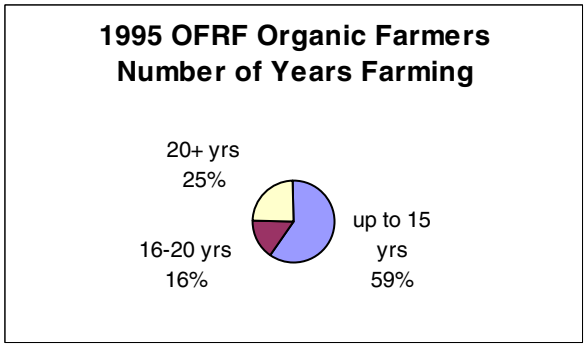


Figure 3

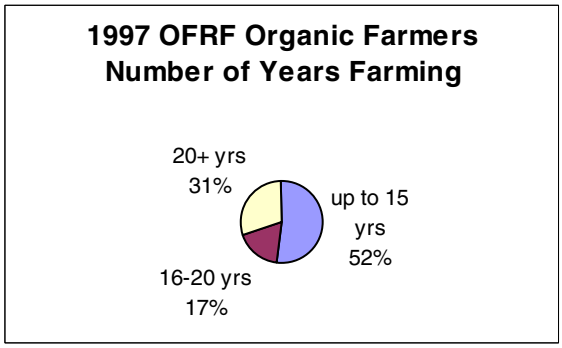
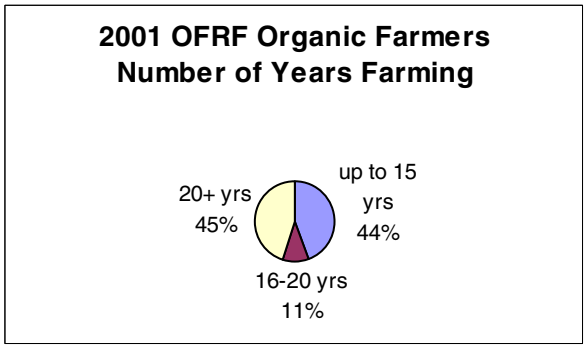
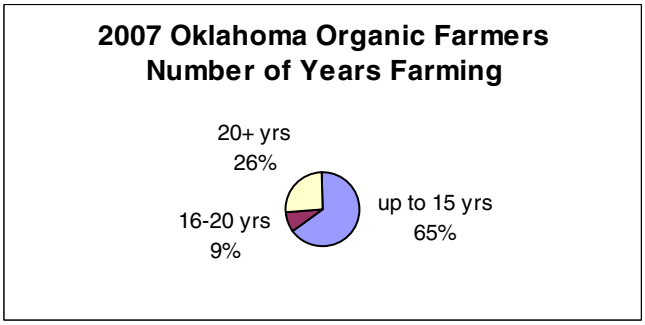


Figure 4



Figures 1-4 - Information from Walz, 2004, p.92

Figure 5



Over ninety percent (91.7%) of the organic respondents have at least some college education (Survey Question #17), with 75% of the respondents holding a degree: 7 respondents hold associate's degrees (11.7% of the respondents), 24 respondents (40%) hold bachelor's degrees, 10 (16.7%) hold master's degrees, and 4 (6.7%) hold doctoral degrees (Table VIII). Oklahoma organic farmers appear to be more educated than their national counterparts on the whole (Figure 6) (Walz, 2004, p.101).

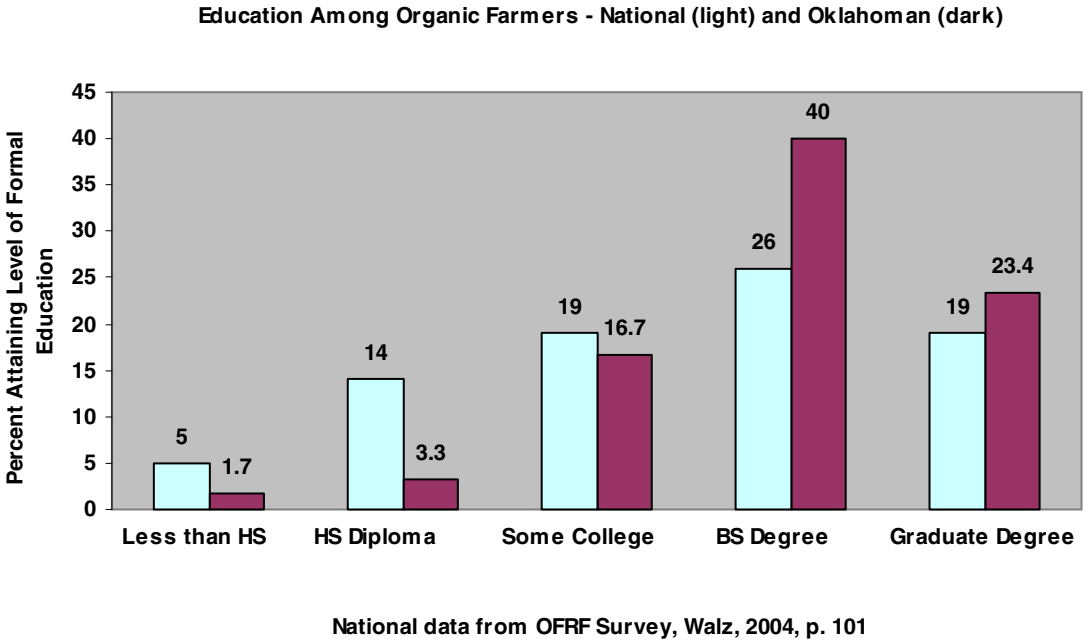
TABLE VIII

DISTRIBUTION OF ORGANIC RESPONDENTS BY HIGHEST LEVEL OF EDUCATION COMPLETED

Highest Education	< HS diploma N (%)	HS diploma N (%)	Vo-Tech or professional courses N (%)	Some college N (%)	Assoc. Degree N (%)	BS or equiv N (%)	MS or equiv N (%)	PhD or equiv N (%)
Organic Certified	0 (0%)	1 (6.2%)	1 (6.2%)	5 (31.2%)	0 (0%)	5 (31.2%)	3 (18.8%)	1 (6.2%)
Organic Certified-Transitional	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	2 (100%)	0 (0%)	0 (0%)
Oklahoma All Natural*	1 (2.4%)	1 (2.4%)	1 (2.4%)	5 (11.9%)	7 (16.7%)	17 (40.5%)	7 (16.7%)	3 (7.1%)
Organic Total	**1 (1.7%)**	**2 (3.3%)**	**2 (3.3%)**	**10 (16.7%)**	**7 (11.7%)**	**24 (40%)**	**10 (16.7%)**	**4 (6.7%)**

* One nonrespondent.

Figure 6



Though most of the organic respondents hold degrees, Table IX (Survey Question #18) shows that four of the responding certified organic farmers (26.7% of the respondents) and twenty (48.8%) of the responding Oklahoma All Natural producers have no formal agricultural training at all. In terms of formal agricultural training, six

(40%) of the responding certified organic farmers had some college or university classes, five (33.3%) had some other form of continuing educational classes, three (20%) had taken extension courses or had been involved with FFA, two (13.3%) had been involved with 4H, and one (6.7%) had taken a vocational-agriculture class, earned an agricultural degree, or done a year apprenticeship on an organic farm.

Both responding organic-transitional producers (100%) had been involved with 4H, and one (50%) had been involved with FFA, had taken a college or university course, or had an extension course. The highest number of Oklahoma All Natural producers with experience in one type of formal agricultural training was twelve (29.3% of respondents) who had taken a college or university course, followed by ten (24.4%) with experience in other continuing education opportunities. Nine (22%) responding Oklahoma All Natural producers had taken an extension course, 7 (17.1%) had an agricultural degree, five (12.2%) had taken vocational-agriculture courses, and four (9.8%) had experience with 4H and FFA. Two (4.9%) also reported gaining formal agriculture education through seminars by non-traditional farmers, or through American Farmer 1960.

Overall, many Oklahoma organic farmers have either no formal agricultural training (41.4%) or received training in agriculture in a college or university setting (32.8%). About a quarter of the organic farmers in the state have had continuing education courses (25.9%) or extension courses (22.4%). Few have agricultural degrees, experience with 4H or FFA (13.8%), or have taken a vocational-agriculture course (10.3%). This low involvement with formal agricultural training, together with the fact that more than half of Oklahoma organic farmers were not raised on farms (Table II), could be a sign that organic farming is a popular "hobby," or, more than likely, it could

be a symptom of the fact that many land grant universities and other traditional agricultural service providers (such as government agencies) do not invest time or research dollars into organic agricultural research or extension.

In fact, the 2001 OFRF Survey respondents ranked university-based resources, state agricultural departments, and the USDA as the least useful organic information resources. Ranked most useful were informal sources—other farmers, buyers, newsletters, customers, etc. (Walz, 2004, p.77).

TABLE IX

DISTRIBUTION OF ORGANIC RESPONDENTS
BY FORMAL AGRICULTURAL TRAINING

Type of Training	**4H** N (%)	**FFA** N (%)	**Vo-Ag Courses** N (%)	**College/ University** N (%)	**Other Continuing Ed** N (%)	**Extension Courses** N (%)	**Ag Degree** N (%)	**None** N (%)	**Other** N (%)
Organic Certified	2 (13.3%)	3 (20%)	1 (6.7%)	6 (40%)	5 (33.3%)	3 (20%)	1 (6.7%)	4 (26.7%)	1[A] (6.7%)
Organic Certified-Transitional	2 (100%)	1 (50%)	0 (0%)	1 (50%)	0 (0%)	1 (50%)	0 (0%)	0 (0%)	0 (0%)
Oklahoma All Natural	4 (9.8%)	4 (9.8%)	5 (12.2%)	12 (29.3%)	10 (24.4%)	9 (22%)	7 (17.1%)	20 (48.8%)	2[B] (4.9%)
Organic Total	**8 (13.8%)**	**8 (13.8%)**	**6 (10.3%)**	**19 (32.8%)**	**15 (25.9%)**	**13 (22.4%)**	**8 (13.8%)**	**24 (41.4%)**	**3 (5.2%)**

A = year apprenticeship on organic farm
B = seminars by nontraditional farmers, American Farmer 1960

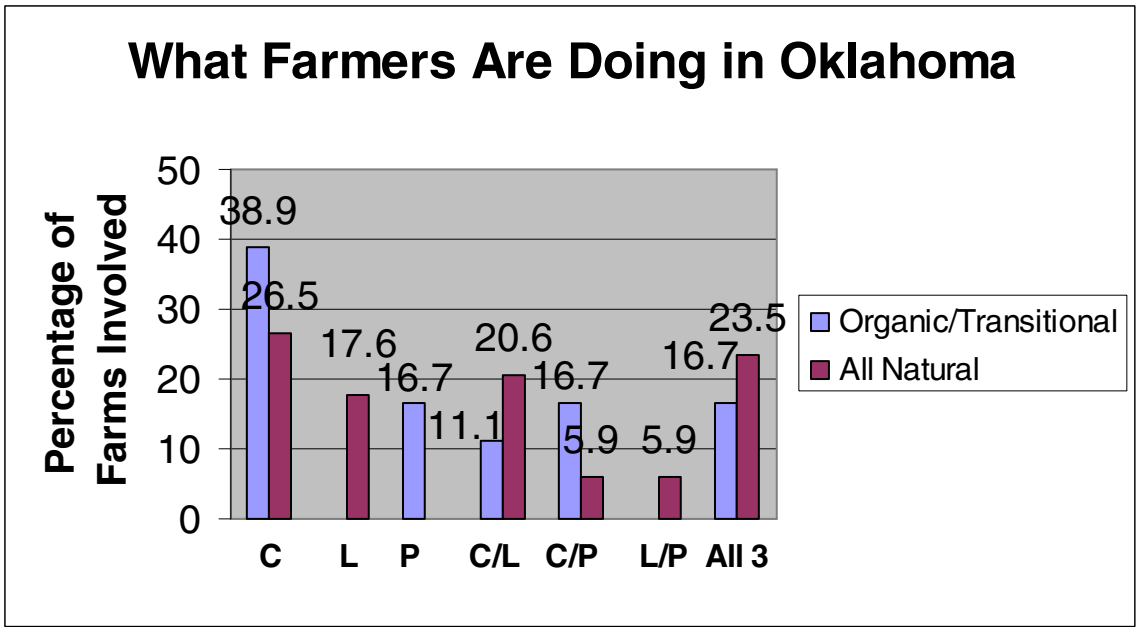
There are three areas of farming in which the Oklahoma organic certification agent may issue a license: crops, livestock, and processor/handler operations. Questions ten, eleven, and twelve on the survey asked respondents to identify organic crops, livestock, and products processed (if any) on the farm. Oklahoma certified and transitional farmers, when compared with Oklahoma All Natural farmers, differ in what they do on their farms. With 18 respondents in the certified organic and transitional category, 38.9% (seven farms) only raise crops on their farm, none strictly raise

livestock, 2 farms (11.1%) raise both crops and livestock, 3 (16.7%) raise crops and do on-farm processing, 3 (16.7%) just do on-farm processing (no raising of crops or livestock), and 3 (16.7%) raise crops and livestock, and do on-farm processing.

Thirty-four (79.1%) of the all natural farmers responding to the survey answered questions ten, eleven, and twelve. Compared to the organic and transitional farmers, they seem to be more involved in livestock production: 26.5% (9 farms) only raise crops, 17.6% (6 farms) only raise livestock, 20.6% (7 farms) raise both crops and livestock, 2 farms each (5.9%) either raise crops and process them on-farm or raise livestock and process them on-farm, and 8 farms (23.5%) raise crops and livestock, and process them on-farm. In sum, only 27.8% of organic and transitional producers are involved in livestock production (5 of 18), compared with 67.6% of all natural producers (23 of 34). The 2001 National Organic Farmers' Survey showed only 20% of organic farmers (with 1,012 responses) producing livestock (Walz, 2004, p.44), so Oklahoma organic farmers appear to be in line with the rest of the organic farmers of the nation. It is not too surprising to find so few organic livestock: to be certified organic, livestock must be fed organic feed. With no organic feed dealers in Oklahoma (Fanatico, 2006), farmers are driving to Arkansas or other states, or being forced to grow their own feed organically, if they want to be able to market certified organic meat.

The chart below summarizes these results: C = produces only crops, L = produces only livestock, P = only processes on-farm, C/L = both crops and livestock produced, C/P = crops produced and on-farm processing done, L/P = livestock produced and on-farm processing done, All 3 = crops and livestock produced, and on-farm processing done.

Figure 7



The following chart (Table X) demonstrates how Oklahoma organic certified and transitional farmers, as well as Oklahoma All Natural farmers (and Oklahoma organic overall) compare to the national organic farmers in terms of specific crop and livestock production.

TABLE X

NUMBER (N) AND PERCENTAGES (%) OF FARMERS ENGAGED IN DIFFERENT TYPES OF PRODUCTION

Production	Oklahoma Organic/ Transitional N (%)	Oklahoma All Natural N (%)	Oklahoma Organic (Overall) N (%)	2001 National Organic Farmers' Survey (%)
Herbs, Floriculture, Ornamental or Greenhouse, Mushrooms, Honey	5 (27.8)	8 (23.5)	13 (25.0)	33.0
Vegetables	11 (61.1)	20 (58.8)	31 (59.6)	43.0
Fruit, Nut, Tree Crops	3 (16.7)	10 (29.4)	13 (25.0)	36.0
Grains, Alfalfa, Mixed Hay, Other Field Crops	6 (33.3)	3 (8.8)	9 (17.3)	45.0
Livestock	5 (27.8)	23 (67.6)	28 (53.8)	20.0

Research Question Two: "What motivates Oklahoma farmers to produce organically?" Questions four and five on the survey asked respondents, through check-off lists and free response, what encourages them to practice organic methods of agriculture. All 61 organic producers in Oklahoma answered question four, the check-off list. The following table (Table XI) records the number (N) and percentages (%) of certified organic and transitional organic farmers selecting each response on the check-off list. At least two-thirds of the certified and transitional organic farmers produce organically for:

1. financial reasons -- niche market available (15 of 18 respondents, or 83.3%)

-- customers actively seeking organic produce (12 of 18, 66.7%)

2. health reasons – no chemical residues on food (14 of 18, 77.8%)

-- no additives or treatments in organic foods (12 of 18, 66.7%)

3. ecological reasons – sense of stewardship (13 of 18, 72.2%)

-- little or no chemical use (13 of 18, 72.2%)

Personal reasons for producing organically, such as encouragement from friends or family, or organic farming being a fun hobby, ranked well below most other reasons, with "family activity" being the most popular personal reason, chosen by one-third of the respondents (6 of 18).

These data show that certified organic producers in Oklahoma may fall into Darnhofer et al.'s "pragmatic organic" category. This farmer "tends to perceive organic farming as offering a good prospect for securing an income" and "are primarily looking for an alternative to the conventional farming system, either because they resent agri-business or because they do not believe in the modernization paradigm and thus seek a way off of the 'treadmill' (2005, p.48)."

TABLE XI

SELECTED REASONS FOR PRACTICING ORGANIC

METHODS OF AGRICULTURE (CERTIFIED AND TRANSITIONAL FARMERS)

Rank	Reason for Encouragement in Practicing Organic Methods	N	%
1	Niche Market Available	15	83.3
2	No Chemical Residues on Food	14	77.8
3	Sense of Stewardship	13	72.2
	Little or No Chemical Use	13	72.2
4	Customers Actively Seeking Organic Produce	12	66.7
	No Additives or Treatments in Organic Foods	12	66.7
5	Protect Children from Chemical Exposure	11	61.1
6	Tastes Better	10	55.6
	More Vitamins in Organic Foods	10	55.6
	Protect Farm Workers from Chemical Exposure	10	55.6
7	Better for Wildlife	9	50.0
	Allows Family Farms to Survive Among Corporate Farms	9	50.0
8	No Genetic Modifications That Could Be Released into the Environment	8	44.4
	Preservation of Biodiversity	8	44.4
	Allows Families to Become More Self-Sufficient	8	44.4
	No Antibiotics	8	44.4
9	Saves Energy	6	33.3
	Animal Welfare Concerns	6	33.3
	Family Activity	6	33.3
10	Fun Hobby	4	22.2
11	Fewer Emissions from Farm Equipment	2	11.1
	Costs Less to Implement	2	11.1
	Allows for More Diversification and Less Financial Risk for the Farm	2	11.1
	Encouragement from Friends or Family	2	11.1

Total respondents = 18

The following table (Table XII) records the number (N) and percentages (%) of Oklahoma All Natural farmers selecting each response on the check-off list. At least two-thirds of the Oklahoma All Natural farmers produce organically for:

1. health reasons—no chemical residues on food (37 of 43 respondents, or 86%)

— no antibiotics (34 of 43, or 79.1%)

2. ecological reasons—little or no chemical use (33 of 43, or 76.7%)

— sense of stewardship (30 of 43, or 69.8%)

Again, personal reasons for producing organically rank below most other reasons, with "fun hobby" and "family activity" being the most popular, at 25.6% (11 of 43 respondents). Financial reasons for organic production do not rank as high with Oklahoma All Natural farmers as with organic certified and transitional farmers. While 83.3% of certified and transitional organic farmers put a financial reason (niche market available) as a reason for going into organic production, that same reason, which was the highest ranked financial reason with Oklahoma All Natural producers, was only chosen by 25 of 43 respondents, or 58.1% of the producers.

TABLE XII

SELECTED REASONS FOR PRACTICING ORGANIC

METHODS OF AGRICULTURE (OKLAHOMA ALL NATURAL FARMERS)

Rank	Reason for Encouragement in Practicing Organic Methods	N	%
1	No Chemical Residues on Food	37	86.0
2	No Antibiotics	34	79.1
3	Little or No Chemical Use	33	76.7
4	Sense of Stewardship	30	69.8
5	Animal Welfare Concerns	28	65.1
	Tastes Better	28	65.1
6	No Additives or Treatments in Organic Foods	27	62.8
7	Niche Market Available	25	58.1
	Allows Families to Become More Self-Sufficient	25	58.1
8	Protect Children from Chemical Exposure	24	55.8
9	Better for Wildlife	23	53.5
	Customers Actively Seeking Organic Produce	23	53.5
	More Vitamins in Organic Foods	23	53.5
10	Preservation of Biodiversity	21	48.8
11	No Genetic Modifications That Could Be Released into the Environment	19	44.2
12	Protect Farm Workers from Chemical Exposure	18	41.9
13	Saves Energy	14	32.6
	Allows Family Farms to Survive Among Corporate Farms	14	32.6
14	Allows for More Diversification and Less Financial Risk for the Farm	11	25.6
	Fun Hobby	11	25.6
	Family Activity	11	25.6
15	Costs Less to Implement	10	23.3
16	Encouragement from Friends or Family	8	18.6
17	Fewer Emissions from Farm Equipment	7	16.3

Total respondents = 43

Table XIII compares the rankings of selected reasons for practicing organic methods of agriculture between certified and transitional organic farmers, and Oklahoma All Natural farmers.

TABLE XIII

RANKINGS OF REASONS FOR PRACTICING ORGANIC – A COMPARISON

Certified/ Transitional Organic Rank	Reason for Encouragement in Practicing Organic Methods	Oklahoma All Natural Rank
1	Niche Market Available	7
2	No Chemical Residues on Food	1
3	Sense of Stewardship	4
	Little or No Chemical Use	3
4	Customers Actively Seeking Organic Produce	9
	No Additives or Treatments in Organic Foods	6
5	Protect Children from Chemical Exposure	8
6	Tastes Better	5
	More Vitamins in Organic Foods	9
	Protect Farm Workers from Chemical Exposure	12
7	Better for Wildlife	9
	Allows Family Farms to Survive Among Corporate Farms	13
8	No Genetic Modifications That Could Be Released into the Environment	11
	Preservation of Biodiversity	10
	Allows Families to Become More Self-Sufficient	7
	No Antibiotics	2
9	Saves Energy	13
	Animal Welfare Concerns	5
	Family Activity	14
10	Fun Hobby	14
11	Fewer Emissions from Farm Equipment	17
	Costs Less to Implement	15
	Allows for More Diversification and Less Financial Risk for the Farm	14
	Encouragement from Friends or Family	16

The biggest differences between the certified and transitional organic farmers and the Oklahoma All Natural farmers appear to be regarding antibiotic use (34.7%), animal welfare concerns (31.8%), and niche market availability (25.2%) (Table XIV). Not using

antibiotics ranks second in importance (79.1%) among Oklahoma All Natural farmers. This isn't too surprising, considering that food labeled "natural" by the USDA definition is to be free of synthetic substances such as antibiotics (USDA, 2005); consumers wanting to give their families food free of chemicals such as steroids, hormones, or antibiotics but not wanting to pay organic premiums probably seek out "all natural" farmers. Not using antibiotics is probably bumped lower (44.4%) among Oklahoma certified and transitional farmers because it ranks under some of the financial reasons for organic farming, such as "niche markets available," "customers actively seeking organic produce," and "allows family farms to survive among corporate farms." Considering the financial and time outlay needed for engaging in organic farming, it is not too surprising to find antibiotic use ranked lower on the list. And antibiotics are allowed, even required (for humane reasons) in organic agriculture when needed, although that particular animal cannot be marketed as organic after treatment (National Organic Program, 2003).

Organic certified and transitional farmers ranked animal welfare concerns ninth, with only 33.3% considering it important, which was lower than the Oklahoma All Natural farmers ranked it (fifth, with 65.1% of farmers considering it important), but perhaps that is because only 5 of the 18 certified and transitional farmers (27.7%) raise livestock, compared with 22 of 43 All Natural farmers (51.2%).

The majority of organic and transitional farmers (83.3%), and a lesser percentage of the Oklahoma All Natural farmers (58.1%), considered an available niche market important for encouraging organic methods of agriculture. Organic farmers are more likely to bring in the premiums, since there are legal definitions and certifying bodies for organic—not so for all natural, which is only regulated for meat and poultry (Food

Marketing Institute, 2007). Even the word 'natural' is currently under a reopened and extended public comment period with the Food Safety and Inspection Service (Federal Register, Jan.18, 2007), so it is rather loosely interpreted compared to the stringent organic standards of today.

TABLE XIV

PERCENTAGE DIFFERENCES IN REASONS FOR PRACTICING ORGANIC

Reason for Encouragement in Practicing Organic Methods	**Certified/ Transitional (%)**	**Oklahoma All Natural (%)**	**Difference**
No Antibiotics	44.4	79.1	34.7
Animal Welfare Concerns	33.3	65.1	31.8
Niche Market Available	83.3	58.1	25.2
Allows Family Farms to Survive Among Corporate Farms	50.0	32.6	17.4
Allows for More Diversification and Less Financial Risk for the Farm	11.1	25.6	14.5
Protect Farm Workers from Chemical Exposure	55.6	41.9	13.7
Allows Families to Become More Self-Sufficient	44.4	58.1	13.7
Customers Actively Seeking Organic Produce	66.7	53.5	13.2
Costs Less to Implement	11.1	23.3	12.2
Tastes Better	55.6	65.1	9.5
No Chemical Residues on Food	77.8	86.0	8.2
Family Activity	33.3	25.6	7.7
Encouragement from Friends or Family	11.1	18.6	7.5
Protect Children from Chemical Exposure	61.1	55.8	5.3
Fewer Emissions from Farm Equipment	11.1	16.3	5.2
Little or No Chemical Use	72.2	76.7	4.5
Preservation of Biodiversity	44.4	48.8	4.4
No Additives or Treatments in Organic Foods	66.7	62.8	3.9
Better for Wildlife	50.0	53.5	3.5
Fun Hobby	22.2	25.6	3.4
Sense of Stewardship	72.2	69.8	2.4
More Vitamins in Organic Foods	55.6	53.5	2.1
Saves Energy	33.3	32.6	0.7
No Genetic Modifications That Could Be Released into the Environment	44.4	44.2	0.2

Both groups appear similarly motivated to produce organically (less than ten percent difference, and at least half of each group selected the item as important) because of health and ecological reasons: more vitamins in organic foods (2.1% difference), sense of stewardship (2.4% difference), better for wildlife (3.5% difference), no additives or treatments in organic foods (3.9% difference), little or no chemical use (4.5% difference), protect children from chemical exposure (5.3% difference), no chemical residues on food (8.2% difference), and tastes better (9.5% difference).

Table XV compares the results of the 2001 National Organic Farmers' Survey (Walz, 2004, p.95) with the overall results shown by Oklahoma organic farmers.

TABLE XV

REASONS FOR FARMING ORGANICALLY - OKLAHOMA AND NATIONAL

Reasons for Farming Organically	**National Organic Farmers Survey Results 2001 Ranking (N=1,003)**	**Oklahoma Farmers 2007 Ranking (N=61)**
Stewardship	1 Land Stewardship	3 Sense of Stewardship
Chemical Avoidance	1 For Family 1 For Farm Workers	8 To Protect Children 13 To Protect Farm Workers
Chemical Avoidance	2 For Environmental Health	2 Little or No Chemical Use
Ecological Principles	4	11 Better for Wildlife 12 Preserves Biodiversity 18 Saves Energy 22 Fewer Emissions
Quality of Organically Grown Products	5	1 No Chemical Residues 4 No Antibiotics 6 No Additives/Treatments 7 Tastes Better 10 More Vitamins
Personal	6 Community Values, Tradition, Quality of Life	17 Family Activity 18 Fun Hobby 21 Encouragement from Friends and Family
Ethics	7 Philosophical, Spiritual, or Ethical Reasons	9 Animal Welfare Concerns 14 No Genetically Modified Organisms
Economics	9 To Maintain Economic Sustainability of Farm	10 Allows for Self-Sufficient Families 15 Allows Family Farms to Survive Among Corporate Farms 19 Allows for More Diversification/ Less Risk
Organic Prices	10 Organic Price Premiums	5 Niche Market Available
Consumer Demand	11 Growing Consumer Demand for Organic	8 Customers Actively Seeking Organic
Reduce Input Costs	13	20
	(Total of 17 categories)	(Total of 24 categories)

Oklahoma farmers appear to be a lot like their national counterparts in many ways; both seem most driven to farm organically for reasons including stewardship, chemical avoidance in general, and the quality of organic products. Organic farmers appear to be least driven to produce organically in order to keep the farm going

financially, to reduce input costs, or to meet consumer demand.

The last part of question four and all of question five allowed the respondents to write comments about their reasons for producing organically. Reasons cited by organic certified respondents included:

TABLE XVI

REASONS CITED BY OKLAHOMA CERTIFIED ORGANIC FARMERS FOR ORGANIC PRODUCTION

Number of Times Cited	Reason Given
3	It's just the right thing to do; money is not a factor.
1	Premiums
1	Customer requests
1	Nature provides all that is necessary if properly managed.
1	Organic is the most self-sustaining method of farming.
1	Organic benefits our environment now and in the future.
1	Health concerns

These cited reasons mirror the highest ranked checklist items, in that financial (premiums, customer requests), health, and ecological reasons (right thing to do, nature provides, organic is self-sustaining, organic benefits the environment) are the most cited by certified and transitional as reasons for pursuing organic certification.

Reasons cited by Oklahoma All Natural farmers included (Table XVII):

TABLE XVII

REASONS CITED BY OKLAHOMA ALL NATURAL FARMERS FOR ORGANIC PRODUCTION

Number of Times Cited	Reason Given
7	Health concerns
4	Right approach to preserving soil, air, water, and food quality
4	Responsibility to consumer
3	Enjoy occupation
3	Farm income
3	More nutritious (omega-3 fatty acids, etc.)
3	Tastes better
3	Healthy soils decrease inputs.
1	It's the right thing to do.
1	Unable to find produce we like in store
1	Much easier.
1	Allows natural predators to thrive
1	National security—less reliance on corporate producers for chemicals, fuel, etc.
1	Want to be in healthy work environment
1	Accumulative results
1	Educate others
1	Innate drive/passion to raise food, protect environment, and become model for sustainable agriculture as I learn.
1	Perform research using compost
1	See endangered species return
1	Diversification of crops
1	Raise crops that can be used in lieu of some medications
1	Work with nature rather than against
1	Avoid high costs of chemicals
1	Parts of farm support others (chickens eat flies; manure fertilizes, etc.)
1	Produce organically but not certified (avoid red tape)
1	Farm bills and agricultural education are geared toward propping up the status quo—low prices, high costs—guaranteed failure leaves us with opting out of the system as the only logical choice

These results also mirror the results of the checklist items for the Oklahoma All Natural farmers, with health and ecological reasons upstaging financial ones. The all natural farmers appear to be really knowledgeable about the ecological relationships of the land; there are many references to endangered species returning; natural predators

thriving; healthy soils needing fewer inputs; the connection of soil, air, water and food quality; and even accumulative results with the use of organic production.

Research Question Three: "What are the roadblocks to organic production in Oklahoma?" Questions six and seven on the survey asked respondents, through check-off lists and free response, what discourages them while practicing, or trying to practice, organic methods of agriculture. Twelve of the 61 (19.7%) Oklahoma organic respondents skipped question six, the check-off list of what has discouraged them from producing organically. From the 49 that answered the question (10 certified organic (62.5%), 2 transitional organic (100%), and 37 Oklahoma All Natural respondents (86.0%)), the results in number (N) and percentage (%) selecting each reason are shown in Table XVIII below.

TABLE XVIII

REASONS FOR DISCOURAGEMENT OF ORGANIC PRODUCTION AMONG OKLAHOMA ORGANIC PRODUCERS

Reason for Discouragement	Certified Organic N (%)	Transitional Organic N (%)	Oklahoma All Natural N (%)	Total Organic N (%)
Too Many Regulations	3 (30.0%)	2 (100%)	22 (59.5%)	**27 (55.1%)**
Costs More to Implement	6 (60.0%)	2 (100%)	17 (46.0%)	**25 (51.0%)**
Too Labor Intensive	4 (40.0%)	2 (100%)	12 (32.4%)	**18 (36.7%)**
Yields Decreased	5 (50.0%)	1 (50.0%)	11 (29.7%)	**17 (34.7%)**
No Available Market for Products	1 (10.0%)	0 (0.0%)	4 (10.8%)	**5 (10.2%)**
No Time to Learn New Methods	0 (0.0%)	1 (50.0%)	4 (10.8%)	**5 (10.2%)**
Little Information Available on My Organic Practices	1 (10.0%)	0 (0.0%)	4 (10.8%)	**5 (10.2%)**
Don't Know How to Access Available Information	0 (0.0%)	0 (0.0%)	4 (10.8%)	**4 (8.2%)**
Comfortable with Conventional Methods	0 (0.0%)	1 (50.0%)	1 (2.7%)	**2 (4.1%)**
Too Far Along in Career to Change Everything Now	0 (0.0%)	0 (0.0%)	2 (5.4%)	**2 (4.1%)**

According to Table XVIII, Oklahoma organic producers are most discouraged by regulations (55.1%) and implementation costs (51.0%), followed by high labor intensity

(36.7%) and decreased yields (34.7%). The 2001 National Organic Farmers' Survey Results show national organic farmers to be along the same lines, with production losses (weather, weed, and pest/disease related) and high costs (certification, input, and labor costs, as well as obtaining organic premiums) among the top problems ranked by organic farmers (Walz, 2004, p.69).

In a 1989 study (Gallatin, p.45) of Oklahoma farmers and ranchers engaged in alternative agriculture, the top three factors discouraging adoption of alternative agricultural enterprises were:

1. start up costs (23 of 110 respondents, or 20.9%),
2. markets (19 of 110, or 17.3%), and
3. labor (8 of 110, or 7.3%).

A 1991 follow-up study (Purswell, p.63) found the top factors affecting the discontinuation of alternative agricultural enterprises to be:

1. unprofitability (81 of 148 respondents, or 54.7%),
2. lack of labor (69 of 148, or 46.6%), and
3. weather (41 of 148, or 27.7%).

These factors seem to reflect the top concerns of Oklahomans (regulations, money, labor, and yields) as well now as they did almost two decades ago, when those studies were done.

Looking just at the results of the Oklahoma All Natural farmers, nearly sixty percent (59.5%) of the respondents cited too many regulations as the main reason for discouragement of pursuit of organic methods of production. This seems to fit the definition of an "environment-conscious but not organic" farmer, as defined by

Darnhofer, Schneeberger, and Freyer (2005) as: "committed to environmentally friendly farming practices, but . . . currently not [organic]. . .might follow the organic standards very closely, but be wary of the bureaucracy and paperwork involved in certification and/or participation. . .(p.48)."

The last part of question six and all of question seven allowed respondents to detail any barriers encountered while practicing organically. Reasons cited by 11 of the 18 (61.1%) organic certified and transitional respondents are in Table XIX below, with number (N) and percentage (%) of times cited:

TABLE XIX

BARRIERS CITED BY CERTIFIED/TRANSITIONAL ORGANIC FARMERS

N	%	Stated Barrier
2	18.2	To produce enough to be economically feasible requires more hours and equipment than we have available.
1	9.1	Pest pressure
1	9.1	Organic ingredients difficult to obtain (for making organic products).
1	9.1	Until 2 years ago, certification costs not scaled down for smaller farms.
1	9.1	Drought
1	9.1	The 3-year wait during transition is hard.
1	9.1	Organic mills are not as available as on the East/West coasts.
1	9.1	Extra bookkeeping
1	9.1	Weeds

Barriers cited by 27 of the 43 (62.8%) all natural respondents are cited in Table XX, with number (N) and percentage (%) of times cited:

TABLE XX

BARRIERS CITED BY OKLAHOMA ALL NATURAL FARMERS

N	%	Stated Barrier
9	33.3	Lack of organic products (approved fertilizers, certified seeds, feed, etc.)
7	25.9	Lack of awareness/support for organics
5	18.5	Words 'organic,' 'natural,' etc. regulated
4	14.8	More labor involved than in conventional agriculture
4	14.8	Bias toward (big) agribusiness
4	14.8	Lack of research
4	14.8	Increased labor costs that are not recoverable in the price
3	11.1	Equipment costs
3	11.1	No retailers for organic products
3	11.1	Certification costs
3	11.1	Organic regulations often unreasonable
2	7.4	No large volumes of organic products available (for cost efficiency, use)
2	7.4	Farmers are in a chemical trap
2	7.4	Pests
2	7.4	Lack of organic processing plants
2	7.4	Gas and diesel prices
2	7.4	All of the certification paperwork is too much for a small farm
2	7.4	Arrival of industrial organic farms/confined organic animals
1	3.7	National Animal Identification System (NAIS)
1	3.7	Agribusiness, government and universities destroy competition
1	3.7	Focus on ethanol increases costs on seeds, feed, and fuel
1	3.7	Farm equipment designed for 'mega' farms
1	3.7	Laws and policies favor agribusiness and 'good old boys' to detriment of public health, soil, air, water quality, and sustainable farmers
1	3.7	Drought
1	3.7	Surrounded by land that is sprayed with chemicals
1	3.7	Weeds
1	3.7	Reduced yields
1	3.7	No time to do research
1	3.7	Increased fuel consumption
1	3.7	Requires more training and finesse
1	3.7	FDA approval of natural controls is slow
1	3.7	No education system for organic production
1	3.7	Rural thefts, including cattle

The most cited barriers to organic production in the Oklahoma survey were also often cited in the Fourth National Organic Farmers' Survey Results (Walz, 2004, pp.73-75). The results of the Fourth OFRF Survey are in Table XXI, with number (N) and percentage (%) of responses (535 respondents total):

TABLE XXI

BARRIERS CITED BY OFRF SURVEY RESPONDENTS

N	(%)	Stated Barrier
40	7.5	* Competition with large scale producers
34	6.4	* Certification costs
33	6.2	* Input costs and availability
30	5.6	* Labor costs and availability
27	5.0	* NOP Standard: Organic seed and transplants – lack of organic products
27	5.0	* Weather conditions
22	4.1	* NOP Standard: Compost
19	3.6	* Consumer's lack of knowledge about food and food systems
15	2.8	* Paperwork
11	2.1	* Pest management
10	1.9	* Weed management
7	1.3	* NOP Standard: Organic feed – lack of chicken feed
7	1.3	* Lack of processing facilities
6	1.1	* Agribusiness control of food system
5	0.9	* Cost of fuel
5	0.9	* Cost of production
3	0.6	* Industrial organic
1	0.2	* Pesticide drift

* = also mentioned by Oklahoma organic farmers (certified, transitional, all natural)

An Oklahoma respondent specifically mentioned the NOP compost standard with this comment, "Federal organic regulations are often unreasonable—for example, manure compost piles must be turned over at least five times. . ." Several all natural respondents also mentioned the unavailability of organic chicken feed in the state: "There are no organic feed mills in Oklahoma, so only those who can grow their own organic grains can certify their animal products organic," "Organic hay and poultry feed unavailable locally," "No one produces organic chicken feed in Oklahoma," "No local sources of organic feeds," etc.

Lack of support does not seem to be in short supply in Oklahoma for organic and all natural farmers, unfortunately. Comments from all natural farmers included, "Originally the Department of Agriculture was against me starting this business. But I did

it anyway, now they support it," "Our big problem is that since we only have 1/8 of an acre under cultivation, I've been told to my face that we are so small the state and OSU extension will not help us—we're not important enough, only big farms will get help," "I was on the committee to try to update OSU's poultry science building to a commercial processor [for small producers] but there were not enough small producers to make that work," "[There is] no education system for organic production; no support at all except [for] other producers."

Interestingly, not all Oklahoma organic and all natural farmers find barriers to organic production. Some find none at all, or are not discouraged by them. Two of the certified organic farmers (of the 10 responding to the checklist, or 20.0%) specifically wrote "nothing" in the space left for comments on the checklist for their discouragements of organic farming. An additional certified farmer wrote, "Growing organic is not more difficult than conventional methods. Sometimes you just have to rethink a method of dealing with challenges that occur. In some ways it's even easier than conventional methods." Three Oklahoma All Natural farmers (of the 37 responding to the checklist, or 8.1%) also left comments on the checklist: "None of these apply; they are all myths," "Yields do not decrease," and "No discouragements; made commitment for organic." These farmers appear to be in the "committed organic" category of farmers, as defined by Darnhofer et al. (2005): "'Committed organic' farmers are deeply rooted in the founding philosophy of organic farming. . .Economic considerations are secondary. . .They will adapt. . .to overcome a variety of challenges, as their primary aim is to remain true to a philosophical ideal (p.48)."

Nonetheless, there is an organic decertification rate of approximately twenty

percent each year (Strochlic & Sierra, 2007, p.iii). Oklahoma lost three organic producers and one organic processor, out of 39 certified organic producers and processors, between December 13, 2006 and May 10, 2007, according to the Oklahoma Organic Producers and Processors lists updated by the Oklahoma Department of Agriculture, Food, and Forestry. That represents a 10.3% loss in just five months. One certified organic survey respondent wrote, “We will not apply for organic certification again,” while an all natural farmer, apparently a former certified organic farmer, wrote that they, “decertified because of too many regulations.”

CHAPTER V

CONCLUSION

The analysis of data by the researcher was the basis of the following conclusions:

Demographic Patterns Among Oklahoma Organic Farmers

1. Only about one-third of Oklahoma organic farmers grew up on a farm or ranch. A quarter of Oklahoma organic farmers spent some significant amount of time, such as summer vacations, on a farm or ranch. The rest spent no significant time on a farm or ranch while growing up. Exposure to farm life does not appear to have significant influence on whether someone becomes an organic farmer.

2. The majority of Oklahoma organic farmers are male, as are the majority of Oklahoma and national farmers.

3. Almost three-fourths of Oklahoma organic farmers are between the ages of 40 and 59. Most Oklahoma and U.S. farmers are in their late 50s.

4. About a third of Oklahoma organic farmers are part-time farmers. Most of the rest are full-time farmers, with a few weekend farmers.

5. The majority of Oklahoma organic farmers work ten or fewer acres of land.

6. The majority of Oklahoma organic farmers put three-quarters to all of their land in organic production.

7. Oklahoma organic farmers are most likely to have fifteen or fewer years of farming experience. Almost a quarter of them have 25 or more years of farming experience. Oklahoma organic farmers are younger than their national counterparts.

8. Most Oklahoma organic farmers have some college education, and three-quarters of them hold a degree. Overall they have more education than their national counterparts.

9. Many Oklahoma organic farmers either have no formal agricultural training at all, or received agricultural training in a college or university setting. Few have agricultural degrees or have experience with 4H or FFA. About a quarter have had a continuing education course or an extension course. This, together with the fact that not many organic producers were raised on farms, shows that either: a) organic production is more of a hobby, or b) there is little to gain from formal agricultural training in regards to organic production. This second statement is supported by many comments from respondents who reported little support from colleges, universities, and extension offices.

10. Oklahoma certified organic farmers are most likely to only raise crops. Oklahoma All Natural farmers are commonly seen with just crops, just livestock, or both crops and livestock. With a lack of organic feed suppliers in the state, it is not surprising to find most organic farmers raising only crops. Organic livestock must be fed organic feed. It is not economical to travel out of state to secure organic feed.

Motivation for Organic Production

1. Oklahoma certified and transitional farmers are most likely to produce organically for financial, health, or ecological reasons, with “niche market availability” an important reason for over 80 percent of the respondents. Oklahoma All Natural

farmers produce mainly for health and ecological reasons, with “no chemical residues on food” being the most (at over 85 percent) selected reason for producing organically.

2. The biggest differences between Oklahoma certified and transitional organic farmers and Oklahoma All Natural farmers, in terms of motivations for producing organically, are antibiotic use, animal welfare concerns, and niche market availability. Animal welfare and the non-usage of antibiotics during production are much more important to Oklahoma All Natural farmers; niche market availability is much more important to organic certified and transitional farmers.

3. Both Oklahoma and national organic farmers in general rank stewardship, chemical avoidance, and quality of organic products similarly in (high importance) reasons for farming organically.

Roadblocks to Organic Production

1. Oklahoma organic producers are discouraged from organic production mainly because of too many regulations, the high costs of implementation, the labor intensity of organic production, and decreased yields. National organic producers are frustrated by production losses and high input costs.

2. Oklahoma organic producers also cited problems finding organic products such as certified seed, organic feed (especially chicken feed), and approved fertilizers; the lack of support from governmental and educational institutions for organic production in general and to them personally; the bias toward agribusiness; and pests and weeds.

3. Some Oklahoma organic farmers are not deterred by barriers; several are committed to organic farming, do not agree that yields decrease or that it costs more to implement organic practices, or are mainly farming organically for health reasons

and plan to keep doing so for the health of their family and/or customers.

4. Regardless, there are certified farmers decertifying in the state. During the five months between December 2006 and May 2007, four certified organic producers and processors decertified. According to the comments from the survey, the decertification is mainly due to the overwhelming regulations and paperwork that are too burdensome for small farms.

Recommendations

After interpreting the data and drawing the aforementioned conclusions, the following recommendations are made:

1. It is recommended that Oklahoma State University and Langston University, the state's land grant colleges, work to get funding for research in the field of organic agriculture. In this day of growing consumer environmental awareness and concern, it is important to offer consumers alternatives that reduce negative environmental impact. Since organic production minimizes chemical use, which can lead to a healthier environment and healthier people, it should be brought to the top of research priorities. Perhaps funding can be sought from some of the industrial organic companies, such as Tyson and Cargill, which have contracts with farmers in Oklahoma.

2. It is recommended that Oklahoma Cooperative Extension Specialists provide organic test plots and field days to separate organic myth from fact, so that producers can see for themselves how organic production may work for them. Grants are available for this purpose through SARE, the Sustainable Agriculture Research and Education program of the United States Department of Agriculture (USDA).

3. It is recommended that Oklahoma Cooperative Extension Specialists provide more fact sheets based on organic production principles so that organic producers have some guidelines to follow. Currently there are a few fact sheets in the "earth-kind" series, targeting pest control in gardens, and there are fact sheets on IPM (integrated pest management—incorporating several methods of pest control such as biological and mechanical), but organic agriculture is about much more than just controlling pests. The fact sheets should also provide contact information for organic specialists so that organic farmers don't feel alone or alienated when they have questions or concerns. There are Master Naturalists and Master Cattlemen, why not Master Organic Producers?

4. It is recommended that the Oklahoma Department of Agriculture, Food and Forestry develop a plan for recruiting organic feed mills and processors in the state. If it is easier to access the tools needed to practice organic agriculture, perhaps more people would try it. Perhaps the ODAFF could work with the state legislature to get tax incentives for organic product suppliers and processors that locate in the state. The state has given tax incentives to big businesses in order to bring jobs into the state; why not use incentives to get a healthier population and environment?

5. It is recommended that certification paperwork be minimized or streamlined so as not to be overwhelming and discouraging to small farmers who have minimal time to devote to it. Lengthy applications and tedious ongoing recordkeeping of farm practices is a deterrent to certification; labor is already often overwhelming on organic farms due to the minimized use of chemicals. Anything that brings additional workload to the process is going to be a deterrent (as cited by many respondents to the survey).

6. It is recommended that certification costs be waived for family-operated (non-corporate or industrial) farms for the first few years (perhaps up to five), until they have had enough time to get past the initial learning curve and are more likely to be profitable. The first few years of organic farming are the least likely to be profitable—fields are in transition from chemical pest and weed control to mechanical or biological control, any depleted nutrients from excessive tillage or monocultures have to slowly be returned through natural fertilizers--yields are likely to be lowest at the beginning when education occurs mainly through experience and/or in talking with other farmers. In addition, markets have to be sought after and developed, etc.

Recommendations for Additional Research

The researcher makes the following recommendations in regard to additional research, based on concluding the study and summarizing the findings.

1. It is recommended that additional research be conducted into the organic programs of states with higher involvement in organic agriculture, such as California, Iowa, Minnesota, Washington, and Wisconsin (Walz, 2004, pp. 34-35) to see what support programs those states offer and what keeps those farmers in organic production.

2. It is recommended that additional research be conducted into the organic education programs in states that have them, to see how they are funded and supported, in order to learn what is needed to bring an organic education program to Oklahoma. Colorado, Florida, Hawaii, Idaho, Illinois, Iowa, Maine, Minnesota, Pennsylvania, Wisconsin and Wyoming all have colleges or universities offering degrees in either agroecology, sustainable agriculture, or organic agriculture (as of July 2007).

3. It is recommended that additional research be conducted within Oklahoma to discover exactly what information organic producers and processors need, with the intent of finding a way to make that information available to them. Organic producers' contact information is available through the Oklahoma Department of Agriculture, Food and Forestry; the Oklahoma Food Cooperative, the Kerr Center for Sustainable Agriculture's "Oklahoma Food Connection," and Tulsa's Green Directory. Many of the producers have emails; simple checklists with organic farming topics and places for suggested topics could be mailed or emailed to producers in order to survey their informational needs. Fact sheets could be produced by the Oklahoma Cooperative Extension Service; topics could be incorporated into FFA or 4H projects. Organic agriculture sessions could be available at annual farming conventions (Cattlemen's Association, Farm Bureau, etc.). There are a myriad of ways to get needed information out to producers.

4. It is recommended that this study be used as a baseline, and that follow-up studies be conducted on organic agriculture in Oklahoma. What trends will follow--in number of farmers participating in both certified and non-certified organic agriculture, in the amount of research dollars and acres devoted to organic agriculture at land grant colleges and universities, in the amount of up-to-date information and contacts available through the Oklahoma Cooperative Extension Service, etc.? Knowing the answers to these questions will allow researchers to understand the growth of the organic agriculture sector in Oklahoma, and keep pace with their educational and technological needs.

5. It is recommended that organic agriculture be scrutinized to see if it will still fall under the category of 'sustainable agriculture' in the near future. What are the effects of industrial organic agriculture on the local family organic farm? How are major North

American food processors affecting National Organic Program standards and legal definitions of “organic”? How are the very regulations that are so overwhelming to the family organic farmer actually helping to prevent industrial organic growers from driving the local farmers out of business? Regulations do not address the philosophies of organic farming, just the practices. This leads to farmers with an eye only for profits (i.e. corporations, industries) doing just what is required of them, not necessarily what is in the land’s best ecological interest. Over time, industrial organic farming might not be much better for the land than conventional farming. Organic standards need to be protected, to ensure that regulations that keep organic farms ecologically sound for the long run are not jeopardized for financial gain.

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APPENDICES

APPENDIX A

QUESTIONNAIRE

1. **Were you raised on a farm or ranch? Check one.**

	Yes - I was raised on a farm or ranch.
	No - I was not raised on a farm or ranch.
	Some - I was not raised on a farm or ranch, but I spent summers or other significant time at a farm or ranch (working, playing, or visiting).

2. **What is your level of organic production at this time? Check one.**

	Organic certification from the state
	Organic certification – transitional from the state
	Oklahoma All Natural (not officially certified by state, but almost organic)
	Oklahoma Standard (no herbicides or pesticide, some commercial fertilizers)
	Oklahoma commercial (conventional practices, no CAFO animals/products)
	Conventional (conventional practices, CAFO animals/products)

3. **If you are a conventional or 'Oklahoma commercial' producer, have you ever considered becoming organic certified, or using fewer chemicals?**

	Yes – previously certified
	Yes – currently in process of becoming certified
	Yes – thinking about becoming certified
	No

4. **What encouraged you to practice organic methods of agriculture? Check all that apply.**

	Ecological reasons
	Sense of stewardship
	Saves energy (less fuel used, less artificial fertilizer, etc.)
	Fewer emissions from farm equipment
	Better for wildlife (less pollution, more habitat preservation, etc.)
	Little or no chemical use
	Animal welfare concerns (no confined feeding, more natural behaviors, etc.)
	No genetic modifications that could be released into the environment
	Preservation of biological diversity
	Other:
	Financial reasons
	Costs less to implement (no specialized machinery to buy, etc.)
	Niche market available (organic health food stores and restaurants, etc.)
	Customers actively seeking organic produce at farmers' markets, etc.
	Allows for more diversification and less financial risk for the farm
	Allows family farms to survive among corporate farms
	Allows families to become more self-sufficient
	Other:
	Health reasons
	Tastes better
	More vitamins in organic foods
	No chemical residues to be concerned about

	No additives or treatments (irradiation, waxing, etc.) in organic foods
	No antibiotics – not adding to the growing antibiotic resistance problem
	Protect farm workers from chemical exposure
	Protect children from chemical exposure
	Other:
	Personal reasons
	Fun hobby
	Family activity
	Encouragement from friends or family
	Other:

5. **If you have additional reasons for practicing organic, or would like to explain some of the aforementioned reasons, please feel free to do so in the box below:**

6. **What has discouraged you while producing, or trying to produce, organically? Check all that apply.**

	Ecological reasons
	Yields decreased
	Other:
	Financial reasons
	No available markets for products
	Costs more to implement (increased labor and management, certification, etc.)
	Other:
	Time reasons
	Too labor intensive
	No time to learn new methods
	Other:
	Personal reasons
	Comfortable with conventional methods

☐	Too far along in career to change everything now
☐	Other:
☐	**Bureaucratic reasons**
☐	Too many regulations
☐	Other:
☐	**Informational reasons**
☐	Little information available on my organic practices
☐	Don't know how to access the available information
☐	Other:

7. **Please explain any barriers you have encountered while practicing, or trying to practice, organic agriculture:**

8. **On how many total acres of land do you raise crops and livestock (whether you own the land or lease it)?**

☐	Up to 10 acres	☐	251 – 500
☐	11 to 50	☐	501 – 1,000
☐	51 – 100	☐	1,001 – 2,500
☐	101 – 250	☐	2,501 or more

9. **What percentage of your land (whether you own it or lease it) is used to raise <u>organic</u> crops and livestock?**

☐	None	☐	26 to 50%
☐	Some, but less than 10%	☐	51 to 75%
☐	10 to 25%	☐	76 to 100%

10. What organic crops are grown on the farm?

	None
	List:

11. What species of livestock (and how many head each) are raised organically?

	None
	List:

12. What organic products do you process or handle?

	None
	List:

13. What is your age?

	Less than 30 years of age		50 to 59
	30 to 39		60 to 69
	40 to 49		70 and above

14. Are you a:

	Full time farmer/rancher
	Part time farmer/rancher (primary occupation is:)
	Weekend farmer/rancher (primary occupation is:)

15. Are you:

	Male
	Female

16. How many years have you been farming/ranching?

	Less than 5 years		16 to 20
	6 to 10		20 to 25
	11 to 15		More than 25 years

17. What is the highest level of education you have completed? Check one.

☐	Less than high school diploma
☐	High school diploma
☐	Vo-tech or professional courses
☐	Some college courses
☐	Associate's degree
☐	Baccalaureate degree
☐	Master's degree
☐	Doctoral degree

18. Have you had any formal agricultural training? Check all that apply.

☐	4H
☐	FFA
☐	Vo-Ag coursework
☐	College or university coursework
☐	Other continuing education courses
☐	Extension courses
☐	Agriculture degree
☐	None of the above

19. What is the market value of all agricultural products sold off the farm or ranch within the past year?

☐	Less than $5,000
☐	More than $5,000

20. Do you know of any producers or processors that are practicing or have practiced organic agriculture, that might be willing to take this survey? Please list below. Thank you!

Thank you for your time in completing this questionnaire. It is much appreciated!

APPENDIX B

IRB APPROVAL

Oklahoma State University Institutional Review Board

Date:	Friday, March 16, 2007
IRB Application No	GU076
Proposal Title:	Organic Agriculture in Oklahoma: Catalysts and Roadblocks for Producers
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 3/15/2008

Principal Investigator(s

Shelley Elizabeth Mitchell
1620 N. Wildwood Dr.
Stillwater, OK 74075

Lowell Caneday
184 Colvin Center
Stillwater, OK 74075

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

X The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Sue C. Jacobs, Chair
Institutional Review Board

APPENDIX C

POST CARD

Dear Oklahoma Agriculturalist, Hello, I am currently writing a thesis on organic agriculture in Oklahoma. I would like to ask a favor of you that may improve public perception of agriculture and improve extension planning services in the state. In a few days, you will receive a survey from me asking your opinions and experiences with organic agriculture. The survey is completely voluntary, the results are confidential, and it should only take 20 minutes or so to complete. I hope you will accept my invitation to participate. Thank you! Shelley Mitchell	Three S Farms PO Box 936B Stillwater, OK 74076

APPENDIX D

COVER LETTER/CONSENT FORM

Dear Oklahoma Agriculturalist,

As an agriculturalist involved with organic methods, you are invited to participate in a survey as part of a thesis research project titled, *Organic Agriculture in Oklahoma: Catalysts and Roadblocks for Producers*. Shelley Mitchell, B.S., will be the primary investigator; Lowell Caneday, Ph.D., is the thesis committee chair.

The survey will help me determine the characteristics of organic agriculturalists and the reasons they are involved in organic agriculture, as well as any barriers they encounter. The survey should take no more than 20 to 30 minutes to complete, and will be about 20 multiple-choice type questions about organic practices, reasons for producing organically, difficulties faced in organic agriculture, and general demographic information (years of agricultural experience, gender, etc.).

The results of this study will show consumers, as well as professionals in the field (such as extension agents), what motivates Oklahomans to go through the organic certification process, and any barriers impeding their progress. This information may help improve public perception of agricultural practices in the state, possibly help alleviate some barriers to certification, and give agricultural professionals an idea of the local growth of organic agriculture methods, which can help with planning of extension services.

Your participation and input are critical to the success of this study. Your participation is voluntary, and you may withdraw from the study without penalty at any time. There are no known risks associated with this project which are greater than those ordinarily encountered in daily life. The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Your responses will remain confidential and anonymous. Research records will be stored securely on computer until the study is over (no longer than a year), and only researchers and individuals responsible for research oversight will have access to the records. No identifying information will be on any of the research records.

By submitting the survey, you agree to participate in the research. Whether you participate in the research study or not, please keep the $2 bill as a small token of my appreciation for considering the study. If you have questions or comments about the survey, please contact the researcher Shelley Mitchell at catocorky3@yahoo.com or 405-743-3359. If you have questions about the research and your rights as a research volunteer, you may contact Dr. Sue C. Jacobs, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-1676 or irb@okstate.edu.

Please submit the survey within one to two weeks of receiving it. Thank you!

Sincerely,

Shelley Mitchell

If you would like a copy of the survey results sent to you, please fill out the information below and return along with the survey. This page will be separated from your responses so that your responses will remain anonymous and confidential.

Name:
Address:

or email:

VITA

Shelley Elizabeth Mitchell

Candidate for the Degree of

Master of Science

Thesis: ORGANIC AGRICULTURE IN OKLAHOMA: CATALYSTS AND ROADBLOCKS FOR PRODUCERS

Major Field: Environmental Science

Biographical:

Personal Data: Born in Tulsa, Oklahoma. Raised in Oklahoma, Illinois, and Alabama.

Education: Graduated from Union High School, Tulsa, Oklahoma, in May 1990; received Bachelor of Science degree in Biological Science and Bachelor of Science degree in Animal Science with Ranch Management emphasis from Oklahoma State University, Stillwater, Oklahoma, in May 1995 and May 1997, respectively. Completed the requirements for the Master of Science degree with a major in Environmental Science at Oklahoma State University in July 2007.

Experience: Employed in teenage and college years in a wide variety of agricultural and science jobs—poultry science, x-ray crystallography, zoology, small animal and equine veterinary technician, children's zoo intern, horse trainer, riding camp counselor, science camp counselor. From 1999 to present, employed as high school science teacher (Nationally Board Certified) at Stillwater High School, teaching biology, microbiology, and human anatomy/physiology.

Professional Memberships: National Association of Biology Teachers, Oklahoma Science Teachers Association, Oklahoma Education Association

Name: Shelley Elizabeth Mitchell Date of Degree: July, 2007

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: ORGANIC AGRICULTURE IN OKLAHOMA: CATALYSTS AND ROADBLOCKS FOR PRODUCERS

Pages in Study: 103 Candidate for the Degree of Master of Science

Major Field: Environmental Science

Scope and Method of Study: The purpose of this study was to survey organic producers in Oklahoma to examine the characteristics of the people and operations in organic production, the reasons cited for their extent of involvement in organic agriculture, and any barriers they have had to overcome while producing organically. The population used in this study was the certified and non-certified organic producers and processors in the state of Oklahoma. Both numerical and narrative data were collected from the 61 organic respondents, 16 of which represented 41 percent of the certified organic population. Analysis was of frequency and percentage of response, as this study was descriptive in nature, being an initial attempt to collect information about the current status of organic production in Oklahoma.

Findings and Conclusions: The 'average' Oklahoma organic farmer is male, between the ages of 40 and 59, and was not raised on a farm or ranch. He farms full-time and works 10 or fewer acres, 75 percent or more of which are farmed organically. He likely has 15 or fewer years of farming experience, holds a college degree, and, if he has any formal agricultural training at all, it is from a college or university. If he is certified, he probably specializes in crops; non-certified organic farmers often raise crops or livestock or a combination of both. Certified farmers are more likely to produce organically for financial reasons, but both certified and non-certified producers rank health and ecological reasons among their top motivations for producing organically. Like their national counterparts, Oklahoma organic producers rank stewardship, chemical avoidance, and quality of organic products as important reasons for farming organically. Oklahoma organic producers are discouraged from organic production mainly because of too many regulations, the high costs of implementation, the labor intensity of organic production, and decreased yields. Oklahoma organic producers also cited problems finding organic products such as certified seed, organic feed (especially chicken feed), and approved fertilizers; the lack of support from governmental and educational institutions for organic production in general, and to them personally; the bias toward agribusiness; and pests and weeds. Some Oklahoma organic farmers are not deterred by barriers; nonetheless, there was a 10.3 percent decertification rate in Oklahoma in the five-month period including this study.

ADVISER'S APPROVAL: Dr. Lowell Caneday